

BULLETIN OF MISCELLANEOUS INFORMATION No. 3 1937 ROYAL BOTANIC GARDENS, KEW

XIX—NEW CHINESE SPECIES OF GENTIANA.

HARRY SMITH (Uppsala).

The following descriptions of ten species, two subspecies and three varieties of Chinese Gentians recognised as new by Dr. Harry Smith are published here in order that the species concerned may be included in "The Gentians of China" by Mr. C. V. B. Marquand (*infra*, p. 134). With the exception of two species, all of these groups are based on specimens collected by Dr. Harry Smith himself during his travels in China. Numerous other new Chinese Gentians have already been published by Dr. Smith in Handel-Mazzetti's *Symbolae Sinicae*, 7, 950-981 (1936).

The following abbreviations are used for the principal Herbaria in which specimens cited are preserved :— B (Berlin); P (Paris); S (Stockholm); U (Uppsala); W (Wien).

× *Gentiana quaterna* H.Sm., nov. sp. (Sect. *Frigida*); plantae hybridae vel ex hybridisatione derivatae, e grege *Verticillatarum*, praecipue *G. hexaphyllae* relatae.

Perennis; rami floriferi uniflori, 8-13 cm. longi, ut vaginae crebre et minute papilloso-scabriduli. Folia gemmae centralis parum evoluta vel fere deficientia; folia caulina in verticillis quadrifoliis sessilia, 2-3 mm. longe vaginato-connata, acuta-acuminata, suprema approximata calycem subinvolucrantia, 4-6-plo longiora quam lata, 8-14-juga. Flores 6-8-meri, ore (in sicco) 1-3 cm. diametientes, 5-7 cm. longi, lobi fere 1 mm. longe mucronati. Stylus cum ramis stigmatiferis 4-6 mm. longus.

var. *typica* H.Sm., nov. var.

E gemma centrali florendi tempore folia pauca, linearia, vix 1 cm. longa, acuta-acuminata edita. Rami plures, decumbenti-ascendentes, circiter 8 cm. longi, circiter 11-jugi. Folia caulina sursum majora, marginibus ciliato-scabridula, 2 mm. longe vaginato-connata: ima minuta, ovata, vulgo emarcida, media late linearia, basi breviter attenuata, apice rotundata, apiculata, 8-11 × 3 mm. magna, suprema lineari-lanceolata, basi subattenuata, apice acuta-acuminata, mucronulata, ad 14 × 2.5 mm. magna. Flores 6- (rarius 5- vel 7-) meri, 5-6 cm. longi, laete caerulei. Calycis tubus intense rubro-tinctus, circiter 11 mm. longus; lobi lanceolati, acuminato-acuti, 8-10 mm. longi, in media parte 2 mm. lati. Corollae tubus supra medium inflatus, ore (in sicco) vix 2.5 cm. diametro; lobi

ovati, acuminato-acuti, 5 mm. longi et 6-7 mm. lati, 0.7 mm. longe mucronati; plicae subtriangulares, denticulatae, vix 2 mm. longi, ad 8 mm. latae. *Stamina* loco insertionis in tubum inter se circiter 5 mm. longe connata, antheris 3.5 mm. longis, pollen ad 65 pro centum fertile producentibus. *Stylis* cum ramis stigmatiferis circiter 5 mm. longus.

Ut *G. tetraphylla* Kusn. foliis quaternis, flore 6-7-mero distincta. Quae species tamen foliis gemmae nondum evolutis, foliis caulinibus obtusis subapiculatis (nec acuminato-acutis, mucronulatis) multo brevioribus crassiusculis in marginibus cartilagineo-subglabris (nec ciliato-scabris), polline omnino fertili styloque subnullo longe distat.

SZE-CH'UAN REG. BOR.-OCCID.: Merge, mont. occid. in prato alpino c. 3600 m., 31. VIII. 1922, *Smith* 4249 (U, typus); Tsipula in prato alpino c. 4100 m., 26. VIII. 1922, *Smith* 4210 (U).

To judge from the occurrence of quite similar plants in different areas and from the rather high percentage of fertile pollen (c.65%) this form may be considered to represent a race which is segregating from some hybrid population, and is on its way to independence.

G. quaterna and its varieties must not be confounded with *G. tetraphylla* Kusn., which is an established species, well distinguished by marked characters, and with fully fertile pollen.

var. **octoloba** H. Sm., nov. var.

A typo distat : ramis floriferis ad 13 cm. longis 10-11-nodibus ; foliis gemmae paucis lanceolato-linearibus subacutis ad 25×4 mm. magnis, foliis caulinis imis minimis ovatis, supremis subapproximatis internodiis multo longioribus calycem subamplectentibus lineari-obovatis-lanceolato-linearibus ad 20×3.5 mm. magnis, apice in foliis intermediis obtuso in supremis acuto ; floribus 8-meris 5-6 cm. longis ore (in sicco) 3 cm. diametro intense caeruleis et extra in tubo obscuro-vittatis ; calycis lobis suberectis lineari-lanceolatis acutis subapiculatis 12-16 mm. longis in media parte 1.5-2.5 mm. latis basi \pm distincte attenuatis ; corollae lobis ovato-triangularibus 4-5 mm. longis et 6 mm. latis 0.7 mm. longe mucronatis ; plicis subtriangularibus dentatis 3-4 mm. longis et 7 mm. latis ; staminum filamentis liberis 10 mm. longis, antheris 2.5 mm. longis pollen vix 10 pro centum fertile producentibus.

SZE-CH'UAN REG. BOR.-OCCID.: Tsipula in prato alpino, c. 4000 m., 26. VIII. 1922, *Smith* 4208 (U, typus).

Only one specimen was found. The poor fertility of the pollen—barely 10%—seems to confirm the field note, in which the plant was supposed to be a hybrid between species which have turned out to be *G. Veitchiorum* and *G. hexaphylla* var. *septemloba*. The former is indicated by the development of rosette leaves and by the middle cauline leaves being obtuse, the latter by the form of the cauline leaves, by the concentration of the fully developed ones towards the calyx, by their intensely scabrid margin and by the polymeric flowers.

subsp. **sankarensis** *H.Sm.*, nov. subsp.

A typo distat : ramis floriferis 4-7 cm. longis ascendenti-erectis circiter 11-nodibus ; foliis gemmae non evolutis, caulinis mediis late linearibus apice rotundatis apiculatis ad $10 \times 2.5-3$ mm. magnis superioribus lanceolato-linearibus acutis ad $11 \times 2-2.2$ mm. magnis ; corollae tubo angusto, ore (in sicco) 1-1.3 cm. diametro, superiore parte tubi paullum inflata, lobis late ovatis acutis mucronatis, plicis triangularibus lobis subduplo brevioribus ; antheris 2 mm. longis pollen 5-10 pro centum fertile producentibus ; stylo cum ramis stigmatiferis 4-5 mm. longo.

SZE-CH'UAN REG. BOR.-OCCID.: Sankar-vou-mâ, in duriprato, c. 4000 m., 5. IX. 1922, *Smith* 4750 (U, typus).

subsp. **longiflora** *H.Sm.*, nov. subsp.

A typo distat : ramis floriferis ad 9 cm. longis ad 14-nodibus papilloso-glandulosus ; foliis caulinis mediis subobovato-lanceolatis acutis circiter $10 \times 2-2.5$ mm. magnis, supremis linearibus acuminato-acutis 15×2 mm. magnis ; floribus 7-meris 6-7 cm. longis ; calycis tubo circiter 15 mm., lobis lineari-lanceolatis acuminatis 8-10 mm. longis ; corollae tubo superiore parte subinflato, ore 2.5 cm. diametro, lobis late ovatis apice acuminatis fere 1 mm. longe mucronatis, plicis triangularibus integris vel crenulatis acutis 4 mm. longis et 6 mm. latis ; antheris 3 mm. longis pollen ad 60 pro centum fertile producentibus.

SZE-CH'UAN REG. BOR.: Huang-chen-kuan in prato, c. 3300 m., 19.VIII.1922, *Smith* 3826 (U).

This form is probably not a primary hybrid but a later hybridogen segregation. The different individuals are uniform, and the pollen fairly fertile. No other species was found in the same locality, according to the field note, which statement yet hardly can be very reliable, as the flowering season of these plants at the date of collection was in its first beginning. Characters of *G. hexaphylla* and *G. Farreri* can be recognised.

The three subspecies and varieties are distinct between themselves. But I have referred them to *G. quaterna*, as this name does not cover a distinct species, but is meant to include hybrids or hybrid segregations of a certain 4-verticillate type, originating from not ascertained parents, on the one side belonging to *G. hexaphylla* or nearly allied, on the other to some species of the *ornata*-group.

Gentiana viatrix *H.Sm.*, nov. sp. (Sect. *Frigida*).

Perennis ; gemma centralis stoloniformiter 2-4 cm. prolongata, sursum radicans. Infra eam rami uniflori, ascendentes-erecti, 8-11-nodes, 3-5 cm. longi editi. Folia caulina rite 5-verticillata. Flores 5- (raro 6-) meri, sessiles, angusti, sursum sublaete violaceo-caerulei, in tubo flavescences, atro-caeruleo-vittati et parum obscuro-punctati.

Folia caulis stoloniformis opposita, squamiformia, limbo vix vel non evoluto, 4-7-juga, paribus 2-3 supremis majoribus gemmam

involucrantibus ; folia caulina crassiuscula, 2 mm. longe vaginatoconnata, internodiis longiora vel raro iis subaequilonga, sursum sensim accrescentia et approximata, obovata-linear-obovata, sub-acuta-acuta, suprema mucronulata, in marginibus levissime scabridula, $5-8 \times 1.7-2.4$ mm. magna. *Calycis* tubus fere cylindraceus, 7 mm. longus ; lobi obovati-linearilanceolati, breviter acuti, mucronulati, $4 \times 1-1.5$ mm. magni. *Corollae* tubus angustus, medio parum inflatus, ore (in sicco) vix 1 cm. diametro ; lobi 1.5 mm. longe mucronati, late triangulares, minute denticulati, sine mucrone 2.5 mm. longi et circiter 6 mm. lati ; plicae oblique truncatae, erosulae, circiter 6 mm. latae, cum lobo suo dextro continuae. *Stamina* tubo 18 mm. supra basin inserta, filamentis liberis 5 mm. longis deorsum subabrupte incrassatis (in sicco "late alatis" visis) loco insertionis 2-3 mm. longe inter se connatis. *Ovarium* submatum 12 mm. stipitatum, ovoideo-ellipticum, 10×4.5 mm. magnum, apice acutum, in stylum filiforme 5 mm. longum attenuatum, ramis stigmatiferis linearibus demum recurvatis circiter 2 mm. longis. *Semina* subovoidea, irregulariter angularia, 1×0.7 mm. magna, testa albo-lamellosa-areolata.

Ex affinitate *G. Arethusae* Burkill, a qua distat : habitu multo minore, foliis subobovatis (nec linearibus acutissimis), caulibus circiter 10- (nec plus quam 20-) nodibus, corollae lobis 1.5 (nec 3) mm. longe caudatis, stylo filiformi 5 mm. longo (nec subnullo). *G. hexaphylla* inter alia stylo subnullo distincta.

SZE-CH'UAN REG. BOR.-OCCID. : Matang, mont. bor.-orient. in prato alpino aperto, c. 4800 m., 13. IX. 1922, *Smith* 4345 (U, typus).

The name refers to the peculiar habit of this plant, and also of *G. Arethusae*, to remove itself a little distance yearly.

***Gentiana hexaphylla* Maxim. var. *septemloba* H.Sm., nov. var. (Sect. *Frigida*).**

Ad *G. suboccultam* Marquand vergens, a typo distat ; planta majore, foliorum verticillis supremis approximatis calycem involu-
crantibus ; flore 7- (raro 6-) mero majore c. 5 cm. longo, corollae tubo ampliore, ore (in sicco) 1.5 cm. vel ultra diametiente.

SZE-CH'UAN BOR.-OCCID. : Tsipula in prato alpino, c. 4100 m., 26.VIII.1922, *Smith* 4209 (U, typus); ibidem, 2.VIII.1922, *Smith* 4116 (U); ibidem, 5.VIII.1922, *Smith* 2963 (U, forma ad *G. hexaphyllam* recedens).

The variety *septemloba* approaches *G. subocculta* Marquand. Compared with typical *G. hexaphylla*, the variety is more robust, with flowering branches up to 15 cm. long. The upper cauline leaves are longer, up to 15 mm. in length by 3 mm. broad. The apex of the leaves and calyx-lobes is *acute*, apiculated. The flowers are 5 cm. long, with a much wider tube, at the mouth measuring 1.5-2 cm. across (when dried). The variety looks distinct in the type specimen, but is not sharply delimited, being connected with typical *G. hexaphylla* by intermediate forms.

In *G. hexaphylla* the number of leaves in the whorls and the number of lobes to the corolla is not so regular as is stated in Maximovicz's diagnosis. The species is usually 6-merous, but 5- or 7-merous specimens are fairly common. *G. hexaphylla* is best recognised by the following characters : ascending flowering branches, hardly exceeding 8 cm. in length ; upper cauline leaves linear-obovate, up to 10×3.2 mm. in size. Apex of leaves and calyx lobes *rounded* and very *shortly* apiculate. The flowers are about 4 cm. long and, though inflated at the middle, rather narrow, the corolla tube being usually not more than 1 cm. wide at the mouth (when dried); the corolla-lobes varying from broadly ovate to triangular, apex long mucronate (1 mm.).

***Gentiana altorum* H. Sm., nov. sp. (Sect. *Frigida*).**

Perennis, humilis ; folia rosularia subevoluta ; rami floriferi, infra gemmam centralem orti, pauci-plures, ascendentes-erecti, glabrescentes vel \pm sparsim papilloso, 7-9-nodes, 3-8 cm. longi. Flos terminalis sessilis, 3-4.5 cm. longus, subinflatus, sublaete caeruleus, extra in tubo vittatus.

Folia rosularia e basi 3-4 mm. lata subtriangularia, 5-10 mm. longa, in marginibus leviter scabridula ; folia caulina opposita, crassiuscula, vaginato-connata, in vaginis \pm papillosa, marginibus inconspicue scabridulis, ima minora, ovata, acuta, superiora gradatim accrescentia, ovato-linearia, subacuta, ad 13×4 mm. magna, medio vel infra medium folii latiora. *Calycis* tubus obconoideus, 9-11 mm. longus, ore 4-5 mm. diametro ; lobi erecti, lanceolato-lineares, 4-8 mm. longi et 1-2 mm. lati. *Corollae* tubus paullum inflatus, ore (in sicco) 12-16 mm. diametiente ; lobi ovato-triangularis, mucronulati, circiter 4 mm. longi et 5-6 mm. lati ; plicae subtriangulares, integrae vel dentatae, lobis subduplo breviores et iis aequilatae. *Stamina* tubo 15 mm. alte inserta, filamentis liberis circiter 9 mm. longis deorsum modice incrassatis inter se liberis, antheris 2-2.5 mm. longis. *Ovarium* 14 mm. longe stipitatum, stylo cum ramis stigmatiferis 4-5 mm. longo. *Capsula* longe exserta, 14 mm. longa et 5 mm. lata, testa seminum hexagonaliter areolata.

Affinis *G. Veitchiorum* Hemsl., a qua distat : planta glabriore et omnibus partibus minoribus, summa latitudine foliorum semper infra medium folii, filamentis staminum inter se liberis, corollae latioris tubo ampliore subinflato.

SIKANG : Taofu distr.: Zungkong La, in prato alpino, 4200 m., 20. IX.1934, *Smith* 12537 (U, typus) ; ibidem, 4200-4500 m., *Smith* 12535, 12534, 12536, 13927, 13931, 13932 ; Haitzeshan, 4500 m., 31.VIII.1934, *Smith* 11699 ; Mt. Yara, N.W. glacier valley, 4400 m., 29.VIII.1934, *Smith* 11654 ; inter Bejü et Batang, Mäla pass, 4560 m., 13.VIII.1914, *Limpricht* 2164 (Breslau, typica, sub nomine *G. ornata*) ; inter Batang et Litang, Ro-ssä-la, pass between Taschu and Rati, 5000 m., 23.VIII.1914, *Limpricht* 2283 (Breslau, sub nomine *G.*

ornata); between Litang and Ranong, Ngara pass, 5000 m., 26.VIII.1914, *Limpricht* 2300 (Breslau, sub nomine *G. ornata*.—Ut praecedens a typo paullum distat, corollae tubo angustiore non inflato ad *G. Veitchiorum* accedens).

***Gentiana pseudodecumbens* H. Sm., nov. sp. (Sect. *Aptera*).**

Perennis; radix valida, verticalis, vulgo uniceps, monopodium inferne residuis vetustis filamentosis vestitum emittens. Monopodium foliis subrosulatis terminatum, ex axillis infernis ramos floriferos cauliformes singulum vel paucos ascendentes-suberectos 10–20 cm. longos vulgo 4-nodes edens. Flores singuli vel saepe terni, in apicibus caulibus ramorumque axillarium sessiles vel pedicellati, 3.5–4.5 cm. longi, subanguste infundibulares, intus intense caerulei, extra cyaneo-virescentes.

Folia rosularia lineari-lanceolata, 7–24 × 0.7–1.8 cm. magna, trinervia, marginibus minutissime scabridula; folia caulina sursum decrescentia, in bracteas angustas floribus subaequilongas trans-euntia, linearia, ad 11 × 0.6 cm. magna. *Calyx* corolla duplo, interdum triplo, brevior, 5-nervatus, vulgo ad dimidium spathaceo-fissus, 12–18 mm. longus, lobis 5 lineari-acuminatis 5–11 mm. longis. *Corollae* lobis late ovati, basi subattenuati, apice subobtusius vel interdum fere acuti, ad 7 × 7 mm. magni; plicae lobis duplo vel triplo breviores, ad 5 mm. latae, triangulares, apice acutae, integrae vel leviter bifidae. *Stamina* medio tubi inserta, filamentis liberis 10–12 mm. longis, antheris 2–2.5 mm. longis. *Ovarium* sessile. *Capsula* matura 25–31 × 5 mm. magna, basi subattenuata, apice acuta, in stylum fere 3 mm. longum attenuata, stigmatibus brevibus subapplanatis patentibus. *Semina* ovali-ovoidea, 1.4–1.8 × 0.6–0.8 mm. magna, testa albescenti-straminea minutissime reticulato-foveolata.

Affinis *G. decumbenti* L., a qua praesertim distat: flore majore, calycis lobis multoties longioribus semper 5, plicis acutis majoribus, capsula non stipitata.

CHILI: Hsiao-wu-tai-shan, Tien-lin-ssü in colle aprico c. 1600 m., 21.IX.1921, *Smith* 171 (U, typus); ibidem, 7.VIII.1917, *Limpricht* 3041 (W, S); inter Tao-lai-shui et Kuo-che-wai, c. 1800 m., 15.IX.1921, *Smith* 1040 (U); Ta-miao in pass Ta-ling, 2.VIII.1912, *Limpricht* 593 (W, S).

MONGOLIA SINENSIS: Tabool, 13.VIII.1920, *E. Rosenius* 1070 (S); inter Tabool et Hallong-osso, 21.VII.1919, *J. G. Andersson* 312a, 312b (S).

***Gentiana oligophylla* H. Sm., sp. nov. (Sect. *Chondrophylla*).**

Planta perennis (?), omnino glabra, gracilis, erecta, ad 17 cm. alta, 6-nodosa, media et superiore parte dichotome ramosa, ramis 2–7 suberectis elongatis unifloris, floribus erectis albo-caeruleis (?) ad 9 mm. longis longe pedicellatis.

Folia rosularia ovato-lanceolata, 9–15 mm. longa, ad 5 mm. lata, breviter petiolata; folia caulina internodiis multoties breviora,

lineari-lanceolata, patentia, recurvato-arcuata, inter se subaequimagna, circiter 5 mm. longa, margine minutissime asperula, mucronulata. *Calycis* 4 mm. longi tubus campanulatus; lobi tubo aequilongi, aciculares, emucronati, sinubus latis rotundatis. *Corollae* tubus 7 mm. longus, fere campanulatus; lobi obtusi, rotundati, media parte latissimi, 2-2.5 mm. longi et 2.5 mm. lati; plicae 1.5-2 mm. longae, 2-2.5 mm. latae, lateribus rectis, parte 1/3 superiore in fimbrias 10-14 clavatas dissolutae. *Stamina* tubo 2 mm. supra basin affixa, filamentis filiformibus 3 mm. et antheris 0.7 mm. longis. *Capsula* semimatura rotundato-oblonga, circum anguste alata, 3.5 × 2.5 mm. magna, stylo subnullo, stigmatibus recurvatis 1 mm. longis. *Ovula* magna, circiter 20. *Capsula* matura et *semina* non visa.

HUPEH OCCID.: sine loc. ind., VI. 1910, *Wilson* 4662 (B).

Species *G. panthaicae* Burk. affinis, sed habitu pergracili valde dissimilis, corollae lobis rotundatis, plicarum fimbriis clavatis, capsula subrotundata et stylo subnullo differt.—*G. delicatula* Hance nom. in sched. herb. Paris. (specimen unicum pauperum vidi) persimilis tamen species aliena est et a *G. oligophylla* distat: flore circiter 10 mm. longo, calycis lobis mucronulatis, sinubus angustis, corollae lobis ovato-ovalibus 3 mm. longis 2.4 mm. latis obtusis, plicis 2.5 mm. longis et 2 mm. latis ad 1/2 partem bifidis apicibus circiter 1 mm. longe fimbriatis, fimbriis filiformibus, staminibus paulo supra medium tubi affixis, ovario semimaturo fere exalato oblongo 3.5 × 1.6 mm. magno ovula 15-20 tenente, stylo brevi distincto.

***Gentiana inconspicua* H. Sm., nov. sp. (Sect. *Chondrophylla*).**

Planta annua, subcrassula, subflaccida, pumila, e basi pauciramosa, ramis ad 3.5 cm. longis 5-nodibus divel trichotomis decumbentibus minutissime albo-papillosis. Flores solitarii, pedicellati, caerulei, angusti, ad 10 mm. longi.

Folia rosularia—si evoluta—ovata, subacuta, 10 × 7 mm. magna, mucronata, in marginibus—aetate interdum glabrescentibus—dense scabro-ciliata; folia caulina recurvato-patentia, in petiolum brevem attenuata, rotundato-obovata, subacuta, mucronata, in marginibus et saepe subtus in nervo mediano ciliata, 3-7 mm. longa, 2-4 mm. lata. *Calycis* angusti tubus ad 4 mm. longus; lobi 1.5 mm. lata. *Calycis* angusti tubus ad 4 mm. longus; lobi 1.5 mm. longi, e basi 0.7 mm. lata acuminati, mucronulati, marginibus et in nervo mediano papilloso. *Corollae* angustae tubus ad 8 mm. longus; lobi vix 2 mm. longi, anguste ovato-triangulares, acuti; plicae breves, oblique triangulares, subacutae, 0.5 mm. longae et 1.5 mm. latae. *Stamina* inaequilonga, tubo circiter 3 mm. supra basin affixa, filamentis liberis 2.8-3.5 mm. longis, antheris oblongo-rotundatis 0.6 mm. longis. *Capsula* obovato-oblonga, 4.5 × 2.5 mm. magna, angustissime alata, stylo distincto brevissimo, stigmatibus recurvatis 1 mm. longis. *Ovula* submatura magna, pauca (pro capsula 6-9), subtrigona, 2 × 0.9 mm. magna, testa levissime reticulato-striatula.

Affinis *G. flexicauli*, sed omnibus partibus multo minoribus, foliorum et lorum calycis marginibus ciliatis inter alia distat.

SZE-CH'UAN BOR.: Dongrergo in Rhododendretis, 4100–4300 m., 20.VII.1922, *Smith* 3903 (U, typus); ibidem, in prato alpino fruticoso, c. 4600 m., 21.VII.1922, *Smith* 3338 (U); ibidem, ad rivulum in Rhododendretis, 4100–4300 m., 20.VII.1922, *Smith* 2979 (U); a typo distat: floribus minus angustis, stria papillosa lorum calycis in tubum decurrente, corollae plicis longioribus, anguste triangularibus, lobis $1/4$ solum brevioribus.—Forma duobus tantum speciminibus visis non satis nota).

***Gentiana heleonastes* H. Sm., nov. sp. (Sect. *Chondrophylla*).**

Planta annua, glabra, tenuis, e basi pluriramosa, ramis simplicibus elongatis 6–8-nodibus inter se aequilongis (4–) 9–17 cm. longis unifloris. Flores erecti, 0.5–1.5 cm. longe pedicellati, 12–18 mm. longi, intus et in plicis albi, extra caerulescentes.

Folia rosularia parva, obovata-ovata, mucronulata, ad 6 mm. longa; folia caulina stricte erecta (caulibus adpressa), internodiis 2–4-plo breviora (infimis brevioribus exceptis), lineari-acicularia, tenuia, mucronulata, ad 10 mm. longa et 1 mm. lata, ad $1/2$ partem vaginato-connata. *Calycis* tubus cylindraceo-obconicus, 6–7 mm. longus; lobi circiter 2.5 mm. longi, e basi vix 1 mm. lata acuminati. *Corollae* tubus circiter 14 mm. longus; lobi ovati, vulgo paullum obliqui, acuti, denticulati, 3–3.5 mm. longi et 2–2.5 mm. lati; plicae subquadratae, lobis $1/3$ breviores, apicibus recte truncatae, laciniatae. *Stamina* tubo 6–7 mm. supra basin affixa, filamentis subinaequilongis gracillimis 2.5–3.5 mm. longis antheris 0.8 mm. longis. *Capsula* oblongo-obovata, circum anguste alata, 7×3.5 mm. magna, stylo 1 mm. longo coronata, stigmatibus recurvatis 1.5 mm. longis. *Semina* oblonga, subangularia, 1.5×0.5 mm. magna, testa albescente levissime striato-reticulata.

Species habitu insignis, *G. Prattii* Kusn., mihi non visae, plicis subquadratis similis, tamen calycis lobis ecarinatis, foliis angustissimis glabris (nec oblongis-ovatis margine ciliatis) distat. A *G. Forrestii* Marquand et *G. pallescente* H. Sm. inter alia plicarum foliorumque forma distincta.

SZE-CH'UAN BOR.-OCC.: Tsipula in uliginosis graminosis, c. 4000 m., 5.VIII. 1922, *Smith* 4192 (typus).

***Gentiana Licentii* H. Sm., nov. sp. (Sect. *Chondrophylla*).**

Planta annua, omnino glabra, caule infra rosulam debili decumbente ad 10 cm. prolongato; rosula caules plures unifloros simplices 2–4 cm. longos emittens. Flores caerulei, erecti, 18–20 cm. longi.

Folia rosularia pauca (4–6), ovato- vel obovato-rotundata, ad 2.4×1.6 cm. magna, obtusa, subapiculata; folia caulina 2–3-juga, infima \pm cuneatim spatulata, superiora linearia, carina dorsali et marginibus cartilagineo-albo-marginata, mucronulata, 7–9 mm. longa. Flores 5-meri. *Calycis* tubus anguste obconicus, 7–8 mm.

longus, basi 1.5, ore circiter 4 mm. diametro ; lobi acuti, anguste triangulares, vix 2 mm. longi, basi circiter 1.2 mm. lati, membrana intercalycina circiter 0.5 mm. lata intercepti, anguste albo-marginati, mucronulati, dorso carina cartilaginea lateraliter crenulata et in tubum decurrente instructi. *Corollae* caeruleae extra virescentis tubus 16 mm. longus, ore circiter 6 mm. diametro ; lobi rotundato-ovati, subapiculati, circiter 2.5 mm. longi et lati ; plicae triangulares, integrae vel leviter bifidae, subacutae, fere 2 mm. longae et latae. *Stamina* medio tubo affixa, fauces non attingentia, filamentis gracilibus 3 mm. longis. *Capsula* obovata, alata, circiter 6 mm. longa et 4 mm. lata, stylo distincto fere 1 mm. longo coronata. *Semina* submatura triquetra, 1.4 × 0.5 mm. magna, testa laevi brunnescente.

Species ex affinitate *G. Thunbergii*, a qua distat : caule infra rosulam valde elongato, foliis rosulariis ± rotundatis obtusis (nec longe acuminatis), floribus minoribus, calycis lobis tubo 4-plo brevioribus (nec ei subaequilongis).

KANSU AUSTRO-ORIENT.: vers Hoan-kia-ho, 17.IV.1919, *E. Licent* 5051 (U, W.).

***Gentiana aphrosperma* H. Sm., nov. sp. (Sect. *Chondrophylla*).**

(Specimen unicum a me visum.) Planta annua, omnino glabra. Caulis e basi simplex, vix 2 cm. longus, ramum singulum gerens. Flores in apicibus solitarii, sessiles, 20 mm. longi, tandem ad 25 mm. crescentes.

Folia rosularia parva, marcescentia, ovato-spathulata ; caulina 4-juga, sursum paullo majora, ad 7 mm. longa, dorso valde alato-carinata, laminis rotundato-ovatis ad 4 mm. latis in petiolum latum contractis, petiolis basi in vaginam circiter 2 mm. longam caulem amplexentem connatis. *Calycis* tubus 16 mm. longus, subcylindraceus, ore 3.5 mm. diametro ; lobi erecti, subacuti, circiter 2 mm. lati, valde alato-carinati, carina aliformi foliacea superne ad 1.2 mm. alta rubro-tincta in majorem partem tubi decurrente. *Corollae* tubus calycem 2-3 mm. superans ; lobi ovati, fere 3 mm. longi et lati ; plicae obliquae (i.e. latere sinistro, e centro floris viso, lobo altius adnato), rotundato-ovatae, lobis 1/4 breviores, apice denticulato-laciniatae. *Stamina* aequilonga, fauces superantia, supra medium tubi affixa, filamentis filiformibus, antheris 1.1 mm. longis. *Capsula* oblongo-linearis, exalata, basi rotundata, apice subacuta, 16 mm. longa et 4 mm. lata, stylo 1 mm., stigmatibus recurvatis 1 mm. longis. *Semina* 2 × 1 mm. magna, testa cellulis magnis inflatis spongiosa longitudinaliter subalato-sulcata.

Species insignis, a ceteris *Chondrophyllis* characteribus foliorum, calycis, corollae et seminum valde aliena.

SZE-CH'UAN BOR.: Hsioeh-shan in prato alpino c. 4300 m., 11.VIII. 1922, *Smith* 3420 (U, typus).

***Gentiana flexicaulis* H. Sm., nov. sp. (Sect. *Chondrophylla*).**

Planta annua, omnino glabra, in vaginis tantum parce papillosa, subcrassula, flaccida, basi simplex vel pauciramosa. Caules et rami

5-13 cm. longi, \pm decumbentes, parce di- vel trichotomi, flexuosi. Flores singuli, longe pedicellati, caerulei, circiter 16 mm. longi.

Folia rosularia ovalia-ovata, inconspicue mucronulata, ad 14×8 mm. magna; folia caulina circiter 5-juga, internodiis 2-5-plo breviora, petiolata vel subpetiolata, petiolis breviter vaginato-connatis, vagina leviter albo-papillosa, laminis rotundatis-rotundato-lanceolatis acutis submucronulatis patentibus 5-10 mm. longis. *Calycis* tubus 5-6 mm. longus, anguste obconicus; lobi erecti, e basi circiter 0.6 mm. lata acuminati, ad 2 mm. longi, sinubus latis, membrana intercalycina horizontaliter expansa. *Corollae* tubus 12-14 mm. longus; lobi ovati, obtusi, 1.5-2 mm. longi; plicae integrae, lobis conformes sed $1/3$ breviores. *Stamina* tubo 4 mm. supra basin adnata, filameptis inaequilongis 4.5-6.5 mm. longis, antheris 0.7 mm. longis. *Capsula* rotundato-ovalis, 4.5×3.5 mm. magna, circum late alata, stylo distincto brevi, stigmatibus recurvatis; capsula matura e corolla longissime excedens. *Semina* triquetra, ad 2×1.1 mm. magna, testa sublaevi stramineo-brunnescente.

Ex affinitate *G. bellae* Franch., a qua inter alia differt: habitu flaccida et decumbente, sinubus inter lobos calycis latis nec acuto-angustis, membrana intercalycina horizontaliter expansa, stylo brevi nec elongato, seminum testa sublaevi (nec albo-cartilaginea striato-reticulata).

SZE-CH'UAN BOR.-OCC.: Sankar-vou-mâ, in silva muscosa coniferarum, c. 3800 m., 9.IX.1922, *Smith* 4343 (typus); Matang, mont. bor.-orient., in prato alpino subhumido c. 4600 m., 15.IX.1922, *Smith* 4420.

XX—THE GENTIANS OF CHINA. C. V. B. MARQUAND.

INTRODUCTION.

The most recent monograph of the genus is Kusnezow's "Subgenus *Eugentiana* Kusnez. generis *Gentiana* Tournef.,"* published in Act. Hort. Petrop. 15, 1-507 (1896-1904). As stated in the preface, this monograph is almost a verbatim translation of the original Russian text† of the work, published in 1894. Hence it does not include 13 new species and 3 new varieties described by Franchet in Bull. Soc. Bot. France, 43, 483-495 (1896). Since that date a great many additions have been made to the gentian flora of China, so that whereas Kusnezow described only 162 species from the entire world, the present revision includes 184 species from China alone, two-thirds of them having been described since Kusnezow's account.

The genus *Gentiana*, as delimited in the present revision, corresponds to subgen. *Eugentiana* Kusnez., with the addition of the two

* Cited in this paper as "Kusnez. Monogr."

† Kusnetzoff, N., Die Untergattung *Eugentiana* Kusnetz. der Gattung *Gentiana* Tournef. Systematische, morphologische und geographische Abhandlung. gr. 8° IX. pp. 531. VII Tabellen. 1 Tafel mit Abbildungen und 4 Kartogramme. St. Petersburg 1894 (Russisch).—Vide Bot. Centralblatt, 63, 135-140 (1895).

sections *Dipterospermum* (C. B. Clarke) Marquand and *Tripterospermum* (C. B. Clarke) Marquand, which up to 1931 were included in a separate genus, *Crawfurdia* Wall. *Crawfurdia* is now reduced to synonymy, its third section, *Pterygocalyx*, having been assigned by the writer to the genus *Gentianella* Moench (1794), which Kusnezow treated as a subgenus of *Gentiana* (see Kew Bull. 1931, 69).

Only seven of the ten sections of *Eugentiana* recognized by Kusnezow are represented in China, those absent being *Coelanthé* (middle and south Europe, Asia Minor, Kamchatka), *Thylacites* (mountains of middle and south Europe), and *Cyclostigma* (Europe, Caucasus, Siberia, Arctic Regions). The two largest sections in China are *Chondrophylla* (73 species) and *Frigida* (53 species). The relatively large section *Pneumonanthe*, which is predominantly American, is represented in China by a single species, *G. scabra* Bunge, whilst *Isomeria* is also represented by one species only, the four others being Himalayan. The section *Otophora* (4 species) is endemic in a small area in S.W. China and adjacent parts of S.E. Tibet and N.E. Upper Burma.

The greatly increased number of species now known makes their differentiation more difficult, and some are not easily classified owing to insufficient material, mature capsule and seeds, for example, being available in relatively few cases.

The distinction between Sect. *Dipterospermum* and Sect. *Tripterospermum* is a very well marked one, based on the seed characters, but the subsidiary characters visible in the flowering stage are not nearly so constant or so reliable. It is unfortunate that most specimens are collected in the flowering stage only, for identification is accordingly very difficult in some such cases.

Among the more important characters employed in diagnosing the species are :—

(1) The seeds ; (2) the shape of the corolla-tube, lobes and plicae ; (3) the stamens, their attachment, the shape of the anthers and their height in the corolla-tube, and the filaments (whether winged or not) ; (4) the leaves ; (5) the branching of the plant and its duration.

There is a strong probability that hybridization has been one of the main factors responsible for the origin of the numerous apparently distinct "forms" now known in this genus. In the absence of direct proof, the monographer is faced with the choice of describing an immense number of microspecies, known in many instances only from single specimens, or of reducing them to a small number of "Linnaean" species, no intermediate course being practicable. Of these alternatives, the latter has been adopted here as being more convenient in the present state of our knowledge. No portion of the genus presents more difficulty than the series *Ornatae* of sect. *Frigida*. Here, from the collectors' observations in the field, there is strong evidence for the existence of natural hybrids, and an exceptional profusion of forms is found in various parts of S.E. Tibet, Yunnan, Szechwan, and the N.E. Upper Burma borders.

The large number of species of *Gentiana* found in South-West China is probably due to the fact that this area is the meeting-point of several Asiatic floras, namely the Himalayan, Tibetan, Northern Asiatic and Northern Burmese floras. Chief among these is the Himalayan, with which the Chinese gentian flora has numerous species in common, particularly in the sections *Frigida* and *Chondrophylla*. In other cases, pairs of representative species are known, one in the Himalaya and the other in South-West China, e.g. *G. tubiflora* and *G. filistyla*. This close relationship between the two floras is explained by the fact that the Himalayan chain can be traced east of the river Tsangpo into China, though it is now obscured by the river gorges in North-West Yunnan which have cut through it from north to south (Kingdon Ward in Journ. Linn. Soc., Bot. **50**, 239-265 : 1935).

In North China the widely extended arid North Asiatic flora is the principal element, and it is here that the section *Aptera* is most largely represented. In the intensively cultivated area of Central and Eastern China, originally covered to a large extent by forests, long since felled by the inhabitants, several species of sect. *Chondrophylla*, e.g. *G. Yokusai* and *G. Loureirii*, are rice-field weeds occurring also in other parts of Asia. In the extreme south there is found a subtropical flora, having affinities with those of Burma and Indo-China. From the above account it will be seen that the flora of China is by no means homogeneous. In no case does any part of the political boundary correspond with a botanical division of the Asiatic flora. Moreover, as the western boundary of China is ill-defined and has changed considerably from time to time, the area covered by "China" has been interpreted in its widest sense in the present work, and accordingly includes a considerable portion of territory on the borders of southern and eastern Tibet and of North-East Burma.

Many hundreds of specimens having been examined for the purposes of this revision, it is impracticable, for considerations of space, to record all the collectors' data individually. Hence these have been summarized in the following form under each species:— (1) general distribution in China ; (2) locality, habitat and altitude ; (3) collectors and their numbers, in alphabetical and numerical sequence respectively.

Through the kindness of Professor Sir W. Wright Smith, the author has been able to examine the whole of the exceptionally rich Chinese material of *Gentiana* preserved at the Royal Botanic Garden, Edinburgh, including all the specimens in the Lévillé herbarium. Dr. E. D. Merrill had kindly sent on loan a very large number of specimens from the Herbarium of the University of California, and from the New York Botanical Garden. At Dr. Maxon's request, Dr. Killip has been good enough to send on loan all the Chinese specimens of *Gentiana* and *Crawfordia* in the United States National Herbarium, Washington. Dr. Harry Smith of Uppsala

has very kindly lent type specimens of all his new species, including a number of new ones for publication in the Kew Bulletin (*vide* p. 125). In order to complete the revision, type material has also been obtained on loan from the following Institutions: Muséum d'Histoire Naturelle, Paris; Botanischer Garten, Berlin; Principal Botanic Garden, Leningrad; Naturhistorisches Museum, Wien, and Botanisches Institut der Universität, Wien (by the courtesy of Dr. H. Handel-Mazzetti).

The author desires to record his best thanks to all the above-mentioned persons and to the Directors of the Institutions concerned for affording these facilities. Mr. I. H. Burkill very kindly placed at the author's disposal a large number of notes he had made on Asiatic species of the genus. Finally the author wishes to express his gratitude to Dr. T. A. Sprague and to Mr. H. K. Airy-Shaw for their friendly co-operation in the completion of the work.

KEY TO THE CHINESE SECTIONS OF GENTIANA

Plants of climbing habit, with distinctly twisted stems:

Seed winged (either surrounded by a discoid wing, or triquetrous, with one side shorter than the other two and all three edges winged); fruit capsular.....III. *Dipterospermum* (p. 139)

Seed not winged (triquetrous, with the three sides equal); fruit fleshyIV. *Tripterospermum* (p. 141).

Plants not climbing, stems not or scarcely twisted:

Corolla deeply lobed, with very short tube and small auriculate plicaeI. *Otophora* (p. 138)

Corolla funnel-shaped, campanulate or tubular-clavate, with a longer tube, 2-4 times as long as the lobes, seldom the same length; plicae always conspicuously developed, though sometimes short:

Stigma expanded, its lobes connate more or less in the form of a small plate or funnel.....

V. *Frigida* Ser. *Uniflorae* (*G. phyllocalyx*) (p. 143)

Stigma-lobes not expanded, linear, free, revolute, or sometimes short and a little expanded, but never connate in the form of a plate or funnel:

Style very long, equalling the elongated ovary or somewhat shorter; ovary many times longer than broad; capsule not rounded at the apex, and without wing-like appendages:

Plicae asymmetrical, deeply cut off from the corolla-lobe on the right as seen from within, fused with the corolla-lobe on the left; stem tetraginous; seeds winged

II. *Stenogyne* (p. 139)

Plicae symmetrical, corolla-lobes gradually attenuated into the tube; stem subterete; seeds not winged

VIII. *Isomeria* (p. 146)

Style short, sometimes absent, either conspicuously shorter than the ovary or, if equalling it (Sect. *Chondrophylla*), then the ovary is ellipsoid, and the capsule rounded at the apex with narrow wing-like antero-posterior appendages which are attenuate into the base :

Seeds covered with membranous scales, which form hexagonal honeycomb-like pits, or not scaly but covered with hexagonal pits.....V. *Frigida* (p. 141)

Seeds not covered with membranous scales or hexagonal pits :

Seeds smooth or minutely rugulose, not winged :

Perennial :

Plants large, usually tall with erect or ascending stems, mostly with a terminal inflorescence; leaves large, usually linear-lanceolate or oblong-ovate ; rhizome covered with a fibrous investment..... VI. *Aptera* (p. 145)

Plants small, usually forming mats ; leaves small ; rhizome not covered with a fibrous investment.....IX. *Chondrophylla* (p. 146)

Annual.....IX. *Chondrophylla* (p. 146)

Seeds with 1-3 wings.....VII. *Pneumonanthe* (p. 146)

Sect. I. OTOPHORA.

Plant densely caespitose with numerous cauline leaves.....

Ser. i. *Otophorae*

Plant not caespitose : cauline leaves few.....Ser. ii. *Decoratae*

Ser. i. OTOPHORAE.

Flowers several or numerous in a densely fasciculate terminal inflorescence.....1. *otophora*

Flowers solitary, terminal :

Corolla scarcely divided to the middle.....2. *otophoroides*

Corolla divided to near the base :

Cauline leaves linear-lanceolate, 3 mm. wide ; stems densely caespitose, spreading from a small caudex.....

3. *damyonensis*

Cauline leaves obovate, 6-7 mm. wide ; stems few, arising from a rather stout non-fibrous caudex.....4. *sichitoënsis*

Ser. ii. DECORATAE.

Leaves and calyx-lobes aristate.....5. *caryophyllea*

Leaves and calyx-lobes not aristate :

Apex of leaves and calyx-lobes obtuse.....6. *tsarongensis*

Apex of leaves and calyx-lobes acute.....7. *decorata*

Sect. II. STENOGYNE.

Plicae of the corolla fimbriate :

Calyx-tube with broad wings.....**8. Kusnezowii**

Calyx-tube not winged.....**9. rhodantha**

Plicae of the corolla erose :

Corolla-lobes caudate.....**10. striata**

Corolla-lobes ecaudate :

Perennial, stem somewhat twining, leaves shortly but distinctly petioled, flowers solitary, terminal, pink.....

11. filicaulis

Annual, stem not twining, leaves sessile, flowers numerous on the branches :

Corolla-tube pubescent on the exterior of the veins.....

12. Souliei

Corolla-tube glabrous on the exterior of the veins :

Calyx-lobes narrowed at the base, with a rounded sinus

13. eurycolpa

Calyx-lobes never narrowed at the base, with an acute or truncate sinus :

Corolla small (up to 1.5 cm.) broadly infundibular, narrowed below into a long narrow tube.....

14. primuliflora

Corolla larger (exceeding 2 cm.), campanulate :

Calyx-tube winged and fringed :

Cauline leaves obtuse.....**21. pterocalyx**

Cauline leaves acute :

Upper leaves scabro-ciliate above...**15. gentilis**

Upper leaves glabrous above.....**16. pulchra**

Calyx-tube not winged and fringed :

Calyx-lobes linear-lanceolate, mucronate ; corolla about 3 cm. long.....**17. serra**

Calyx-lobes linear ; corolla about 2 cm. long :

Stamens longer than the plicae :

Calyx-lobes linear, $\frac{1}{3}$ the length of the tube ; corolla-tube several times longer than lobes.....**18. leptoclada**

Calyx-lobes narrowly triangular, $\frac{1}{5}$ the length of the tube ; corolla-tube $1\frac{1}{2}$ times longer than lobes.....**20. expansa**

Stamens shorter than the plicae.....

19. hapalocaula

Sect. III. DIPTEROSPERMUM.

Corolla-lobes small, triangular, acute, only slightly longer than the plicae (limb of corolla subtruncate) :

Leaves petiolate (petiole 1 cm. long) ; ovary stipitate ; calyx-lobes large, spatulate, erect ; leaves membranous 5-nerved ; anthers 2.5 mm. long.....**22. bomareoides**

- Leaves subsessile (petiole scarcely 2 mm. long) :
- Leaves more or less coriaceous, lanceolate acuminate :
- Flowers 4-5 cm. long ; ovary stipitate ; style very short
23. crawfurdioides
- Flowers less than 3.5 cm. long ; calyx-tube entire with 5 lobes ; ovary stipitate.....**24. fratris**
- Leaves membranous, broadly ovate to suborbicular.....
25. iochroa
- Corolla-lobes ovate-lanceolate or lanceolate much longer than the plicae :
- Corolla-tube curved :
- Calyx-tube entire :
- Calyx-lobes triangular ; capsule elliptic.....**28. khamensis**
- Calyx-lobes linear, minute : capsule oblong.....**27. discoidea**
- Calyx-tube dimidiate spathaceous :
- Calyx-lobes recurved ; anthers 2-3 mm. long.....
28. khamensis
- Calyx-lobes erect ; anthers sagittate, tailed.....
26. curviflora
- Corolla-tube straight :
- Stamens winged on one side only :
- Anthers 6-7 mm. long ; calyx-lobes ovate spathulate.....
29. semialata
- Anthers 3.5 mm. long ; calyx-lobes triangular.....
30. sessiliflora
- Stamens winged on both sides :
- Ovary scarcely stipitate, style very long :
- Calyx-lobes broadly triangular, recurved, corolla lobes attenuate.....**31. Heleni**
- Calyx-lobes long, filiform, erect :
- Plicae short, rounded at the apex :
- Leaves subcoriaceous, cordate-ovate.....**32. cordata**
- Leaves membranaceous, lanceolate :
- Style 1 cm. long ; anthers 1 mm. long
33. membranacea
- Style 5-6 mm. long, anthers 2 mm. long.....
34. cyanea
- Plicae triangular, acute.....**35. Nienkui**
- Ovary on a long stipe ; style very long.....
37. fascicularis var. **biflora**
- Ovary on a long stipe ; style rather short :
- Calyx-tube entire :
- Calyx-lobes linear :
- Corolla-lobes caudate.....**36. caudata**
- Corolla-lobes muticous ; calyx distinctly keeled ; corolla large, purple.....**37. fascicularis**
- Calyx-lobes foliaceous ; leaves 5-7-nerved, petiole 2 cm. long :

- Calyx-lobes connate, erect.....**38. Bulleyana**
 Calyx-lobes free, deltoid, recurved, petiole 3-4 mm.
 long.....**39. Pricei**
 Calyx-tube dimidiate-spathaceous.....**40. dimidiata**

Sect. IV. **TRIPTEROSPERMUM.**

- Fruit very succulent, oblong-ellipsoid, 2-2½ times as long as broad
41. trinervis var. **oblonga**
 Fruit less succulent, cylindrical, at least 4 times as long as broad
42. luteo-viridis

Sect. V. **FRIGIDA.**

- Leaves in whorls of three or more.....Ser. i. *Verticillatae*
 Leaves in pairs :
 Plant annual.....Ser. viii. *Annuae*
 Plant perennial :
 Flowers typically solitary, terminal :
 Plant with a thick caudex ; leaves closely imbricated, with
 a cartilaginous margin.....Ser. iv. *Confertifoliae*
 Plant without a distinct caudex ; leaves less rigid, not closely
 imbricated, without a cartilaginous margin :
 Leaves obovate, attenuate at the base :
 Corolla-tube markedly contracted at the mouth ; calyx-
 lobes spathulate, much narrowed below.....
 Ser. iii. *Suborbisepalae*
 Corolla-tube not contracted, usually somewhat expanded
 at the mouth ; calyx-lobes not narrowed below.....
 Ser. v. *Uniflorae*
 Leaves narrow, usually linear, acute, never obovate ;
 calyx-lobes linear, not narrowed below.....
 Ser. ii. *Ornatae*
 Flowers several together in the inflorescence :
 Radical leaves present, usually linear-lanceolate.....
 Ser. vii. *Multiflorae*
 Radical leaves absent.....Ser. vi. *Sikkimenses*

Ser. i. **VERTICILLATAE.**

- Leaves 3-5 in a whorl :
 Leaves 3 in a whorl.....**43. ternifolia**
 Leaves 4 in a whorl :
 Calyx 6-8-lobed :
 Cauline leaves obtuse, subapiculate, margins subglabrous ;
 style almost none.....**44. tetraphylla**
 Cauline leaves acuminate, acute, margins ciliate-scaberulous ;
 style 4-6 mm. long.....**45. quaterna**
 Calyx 5-lobed ; leaves obtuse, mucronate.....**46. ecaudata**
 Leaves 5 in a whorl :

Ser. iv. CONFERTIFOLIAE.

Calyx-lobes not attenuate at the base :

Stamens as long as the corolla-tube ; flowers 3·5–4 cm. long ;
plicae obtuse, wider than the lobes ; stem very short with very
densely imbricate leaves.....**61. confertifolia**

Stamens much shorter than the corolla-tube ; flowers 6–7 cm.
long ; plicae subacute, much narrower than the lobes :

Calyx-lobes broad ; corolla deep ruddy purple, paler below
62. Georgei

Calyx-lobes narrow ; corolla blue with greenish white spots
on the veins.....**63. Szechenyii**

Calyx-lobes broadly obovate, acuminate, attenuate at the base.....
64. tizuensis

Ser. v. UNIFLORAE.

Calyx very small, completely enveloped by the uppermost pair of
broad, obtuse, obovate leaves.....**65. phyllocalyx**

Calyx not enveloped by the uppermost pair of leaves :

Style elongate ; length of the corolla about five times its diameter
66. filistyla

Style very short ; length of the corolla about 2–2½ times its
diameter :

Stems very short, scarcely 3 cm. high ; corolla-tube 8–10 mm.
in diameter, expanded in the middle ; cauline leaves
obovate :

Leaves 4 mm. wide ; corolla 2·2·5 cm. long, with short
truncate plicae.....**67. Wardii**

Leaves 6–7 mm. wide ; corolla 3 cm. long, with triangular
plicae.....**68. emergens**

Stems ascending, 4–8 cm. long ; corolla subcylindrical, 1·5 cm.
long, tube about 5–6 mm. in diameter ; cauline leaves
ovate.....**69. altigena**

Ser. vi. SIKKIMENSES.

Stamens equalling the corolla-tube in length, filaments very slender
70. chinensis

Stamens much shorter than the corolla-tube :

Filaments winged.....**71. Harrowiana**

Filaments not winged :

Leaves broadly petiolate ; corolla-lobes obtuse, about 3 mm.
long**72. sikkimensis**

Leaves sessile ; corolla-lobes triangular, acute, about 5 mm.
long.....**73. streptopoda**

Ser. vii. MULTIFLORAE.

Calyx-tube dimidiate-spathaceous ; lobes not reflexed.....
74. microdonta

Calyx-tube entire ; lobes erect, patent or reflexed :

Leaves ovate, abruptly attenuate at the base into a long petiole

75. melandriifolia

Leaves not abruptly attenuate at the base into a long petiole :

Calyx-lobes erect :

Flowers 1-3 together on very short stems ; plicae triangular

76. Duclouxii

Flowers numerous ; stems taller ; corolla more or less cylindrical ; plicae much shorter than the lobes :

Leaves all ovate-oblong, obtuse.....**77. rigescens**

Leaves on the stems lanceolate, acute or subacute :

Uppermost leaves surrounding the flowers large, oblanceolate, much exceeding the flowers.....

78. cephalantha

Uppermost leaves linear or linear-lanceolate, shorter :

Corolla-lobes shortly caudate ; plicae small, triangular, acute :

Stem scabrid, cauline leaves elliptic-lanceolate, apex acute.....**79. Davidi**

Stem glabrous ; leaves all linear-lanceolate, apex subobtuse.....**80. Atkinsonii**

Corolla-lobes ecaudate ; plicae truncate :

Calyx-lobes minute, subulate ; flowers sessile.....

81. wasenensis

Calyx-lobes linear to linear-lanceolate ; flowers pedicellate :

Anthers scarcely 2.5 mm. long ; style 3 mm. long :

Flowers 6-8 together in a terminal inflorescence ; leaves 5-8 mm. wide.....

82. Purdomii

Flowers 3 together, terminal ; leaves not exceeding 2.5 mm. wide.....

83. Chingii

Anthers about 3 mm. long ; style short :

Inflorescence trichotomous ; flowers axillary, the lower pedicels frequently very long ; corolla blue.....**84. trichotoma**

Inflorescence capitate ; flowers terminal ; corolla white.....**85. Przewalskii**

Calyx-lobes reflexed :

Basal leaves of the barren stems linear-lanceolate ; stems glabrous :

Corolla greenish-white with dark green spots and striae ; stamens much shorter than the corolla-tube.....

86. apiata

Corolla blue ; stamens slightly shorter than the corolla-tube.....**87. Wilsonii**

Basal leaves of the barren stems lanceolate ; stems more or less scaberulous :

Stamens nearly as long as the corolla-tube ; corolla unspotted, deep blue.....**88. atuntsiensis**

Stamens $\frac{2}{3}$ the length of the corolla-tube ; corolla spotted, yellow :

Corolla-lobes broadly triangular-ovate, obtuse.....

89. Handeliana

Corolla-lobes ovate, acuminate.....**90. stictantha**

Ser. viii. ANNUAE.

Calyx 4-partite, strongly keeled.....(Subser. *Tetramerae*)

Corolla-tube 6-7 mm. wide ; lobes slightly exceeding the plicae ; calyx scarcely exceeding half the length of the corolla-tube

91. lineolata

Corolla-tube 12-14 mm. wide ; lobes 4 times as long as the plicae ;

calyx $\frac{2}{3}$ - $\frac{3}{4}$ the length of the corolla-tube.....**92. praeclara**

Calyx 5-partite, not keeled.....(Subser. *Pentamerae*)

Leaves linear.....**93. picta**

Leaves spatulate :

Flowers 1.5 cm. long ; corolla unspotted ; calyx-lobes large, spatulate.....**94. Blinii**

Flowers 2-3 cm. long ; corolla spotted on the exterior in the dried specimens ; calyx-lobes dimorphous, two of them linear-lanceolate, three larger, spatulate.....

95. yunnanensis

Sect. VI. APTERA.

Basal leaves linear-lanceolate (not exceeding 4 cm. wide) ; cauline leaves narrow, lanceolate, not forming an involucre around the flowers ; upper cauline leaves up to 7 cm. wide ; stem not very stout :

Ovary sessile :

Flowers pedicellate :

Calyx unilaterally divided, spathaceous ; pedicels very long

96. gracilipes

Calyx usually entire, lobes filiform ; pedicels short.....

97. dahurica

Flowers densely aggregated in a capitulum or in densely aggregated whorls :

Corolla-lobes slightly longer than the plicae ; leaves linear ; stem slender.....**98. siphonantha**

Corolla-lobes 2-3 times as long as the plicae ; cauline leaves large, broadly lanceolate ; stem very stout :

Flowers about 2 cm. long :

Calyx-lobes 4-5.....**99. macrophylla**

Calyx-lobes 3.....**100. Fettisowi**

Flowers 3.5-5 cm. long.....**101. pseudodecumbens**

Ovary stipitate :

Plant stemless or with an extremely short stem ; flowers in pairs.....**102. biflora**

Plant caulescent, bearing numerous flowers :

Flowers on distinct pedicels, not clustered in whorls.....**103. straminea**

Flowers sessile, clustered in whorls :

Corolla scarcely exceeding 2 cm. long :

Corolla blue ; lobes rounded at the apex, less than 2 mm. wide.....**104. wutaiensis**

Corolla yellowish ; lobes acute, acuminate, 3.5 mm. wide.....**105. officinalis**

Corolla about 3 cm. long, white ; lobes ovate, acute, 5 mm. wide.....**106. dendrologi**

Basal leaves broad, ovate-lanceolate, 5 cm. or more wide ; upper cauline leaves ovate, up to 7 cm. wide, forming an involucre around the congested flowers ; stem very stout.....**107. crassicaulis**

Sect. VII. PNEUMONANTHE.

Sole Chinese species.....**108. scabra**

Sect. VIII. ISOMERIA.

Sole Chinese species.....**109. Delavayi**

Sect. IX. CHONDROPHYLLA.*

Plicae fimbriate.....Ser. ii. *Fimbriatae*

Plicae not fimbriate :

Calyx-lobes ovate-lanceolate, recurved.....Ser. iii. *Orbiculatae*

Calyx-lobes linear or narrow-triangular, acute :

Stem-leaves linear or subulate, long and very narrow.....
Ser. iv. *Linearifoliae*

Stem-leaves not linear or subulate, shorter :

Lamina as well as other parts of the plant pubescent.....
Ser. i. *Pubigerae*

Lamina glabrous :

Flowers large, carmine-red (up to 5 cm. long).....
Ser. v. *Rubicundae*

Flowers small, blue or white.....Ser. vi. *Humiles*

Ser. i. PUBIGERAE

Sole Chinese species.....**110. pubigera**

* The description of no. 184 *G. suchuenensis* Franch. is too imperfect to permit of its being inserted in the key.

Ser. ii. FIMBRIATAE.

- Rosette leaves linear-lanceolate, up to 3.5 cm. long, 1 cm. wide ;
 stems much branched.....**111. Reynieri**
- Rosette leaves absent or ovate or ovate-lanceolate, up to 2 cm. long ;
 Corolla-tube more than 3 times as long as the calyx-tube :
 Stems unbranched ; plant very small, densely caespitose ;
 anthers oblong, 1.2 mm. long.....**114. formosa**
- Stems branched ; plant larger, not caespitose :
 Corolla-lobes rounded, erose ; flowers blue ; calyx-lobes
 subulate ; anthers 1 mm. long.....**112. grata**
- Corolla-lobes entire, subapiculate ; flower large, pink ; calyx-
 lobes narrow triangular, acute ; anthers 0.7 mm. long
113. burmensis
- Corolla-tube scarcely twice as long as the calyx-tube ; anthers
 elongate, 1 mm. long :
 Calyx-lobes 1.5 mm. long ; corolla-lobes rounded at the apex :
 Corolla up to 1.5 cm. long ; cauline leaves obtuse.....
115. saltuum
- Corolla up to 1 cm. long ; cauline leaves acute.....
116. oligophylla
- Calyx-lobes 3-4 mm. long ; leaves lanceolate or ovate, acute :
 Cauline leaves deltoid-ovate, acute or acuminate ; corolla-
 lobes subobtuse.....**117. panthaica**
- Cauline leaves elliptic-ovate ; corolla-lobes acuminate.....
118. epichysantha

Ser. iii. ORBICULATAE.

- Flowers fasciculate.....**119. intricata**
- Flowers solitary, terminal, or stems branched below :
 Plicae lacinate.....**120. Jamesii**
- Plicae not lacinate :
 Upper cauline leaves reniform ; corolla-tube about twice the
 length of the calyx-tube.....**121. crassuloides**
- Upper (and lower) cauline leaves elliptic-ovate narrower than
 broad ; corolla-tube scarcely exceeding the calyx-tube :
 Style distinct ; plicae bifid.....**122. pseudosquarrosa**
- Style absent :
 Radical leaves few ; plicae obtuse.....**123. Crassula**
- Radical leaves numerous ; plicae acute.....**124. squarrosa**

Ser. iv. LINEARIFOLIAE.

- Interior of the upper part of the corolla-tube pubescent :
 Hairs in the throat of the corolla short ; lobes twice as long as
 the plicae.....**125. faucipilosa**
- Hairs in the throat of the corolla long, pilose ; lobes slightly
 exceeding the plicae.....**126. cuneibarba**

Interior of the upper part of the corolla-tube glabrous :

Calyx-lobes patent.....**127. asterocalyx**

Calyx-lobes erect :

Flowers 2.5-3 cm. long ; cauline leaves erect...**128. scariosa**

Flowers 1-1.5 cm. long ; cauline leaves more or less incurved :

Corolla-lobes obtuse ; plicae laciniate, obtuse, half the length of the lobes.....**129. aristata**

Corolla-lobes acute, more or less cuspidate ; plicae almost as long as the lobes :

Plant unbranched, with a single stem, without distinct basal leaves.....**130. linoides**

Plant with numerous stems arising from a basal rosette of broad, ovate leaves with a distinct hyaline margin.....

131. choanantha

Ser. v. RUBICUNDAE.

Corolla 5-6 cm. long ; rosette leaves smaller than the cauline leaves ; calyx-lobes 6-9 mm. long.....**132. purpurata**

Corolla 2-3 cm. long ; calyx-lobes 2-3 mm. long :

Cauline leaves ovate, scarcely 1 cm. long ; rosette leaves larger than the cauline leaves.....**133. rubicunda**

Cauline leaves lanceolate, about 2 cm. long ; rosette leaves smaller than the cauline leaves.....**134. Bodinieri**

Ser. vi. HUMILES.

Calyx-lobes normally distinctly recurved :

Plant minute ; flowers about 4 mm. long ; leaves without a distinct cartilaginous margin.....**135. subtilis**

Plant larger ; flowers usually exceeding 5 mm. (frequently 10-12 mm.) long :

Leaves with a very distinct cartilaginous margin ; stems single, more or less branched, with numerous flowers.....

136. Yokusai

Leaves without a thickened cartilaginous margin ; stems several from the root, unbranched, with a single terminal flower.....**137. pallescens**

Calyx-lobes always erect, ascending, or spreading :

Flowers minute, 3 mm. long, terminal on very small stems.....

138. microphyta

Flowers larger, on a much larger plant :

Perennial with a small caudex bearing the bases of the old leaves and large fleshy roots.....**139. napulifera**

Annual without large fleshy roots or caudex :

A. Stems numerous from the root, unbranched, with a single terminal flower ; cauline leaves acute or obtuse at the apex, but never rounded :

Leaves and calyx-lobes mucronate ; corolla usually closed, rarely almost open :

- Flowers with elongate pedicels; calyx not enclosed by the uppermost leaves; ripe capsule enclosed in the corolla: Corolla-lobes deltoid, acute.....**140. aperta**
 Corolla-lobes broad, obtuse.....**141. Ivanoviczii**
 Flowers with short pedicels; calyx partly enclosed by the uppermost leaves; ripe capsule more or less exerted from the corolla.....**143. leucomelaena**
 Leaves and calyx-lobes mucronate; corolla usually open:
 Cauline leaves spatulate with recurved acuminate apex: Corolla opening widely, lobes obtuse; plicae triangular, entire or shortly bidentate at the apex.....**144. spathulifolia**
 Corolla closed; lobes acute; plicae ovate, obtuse, mucronate
145. pseudoaquatica
 Cauline leaves narrow-linear or narrow-lanceolate with a long point, or oval-ovate with a short point:
 Cauline leaves lanceolate or linear-lanceolate; calyx-lobes not keeled:
 Plant dwarf, up to 2.5 cm.; flowers sessile.....**146. Grumii**
 Plant up to 17 cm.; flowers long-pedicellate.....**147. heleonastes**
 Cauline leaves oval or ovate:
 Calyx-lobes not keeled.....**148. deltoidea**
 Calyx-lobes keeled:
 Basal leaves oblong-lanceolate, up to about 6 mm. wide (rarely more); flowering stems very numerous; corolla 1-1.5 cm. long.....**149. Prattii**
 Basal leaves broadly ovate, 8-15 mm. wide; flowering stems fewer or very few:
 Fruit extruded from the corolla; corolla up to 1.2 cm. long; cauline leaves numerous, densely imbricated
150. incompta
 Fruit included in the corolla; corolla 1.5-2 cm. long; cauline leaves few, distant.....**151. Licentii**
B. Stem single, bearing one or more flowers, or branched from the base:
 Flowers sessile:
 Flowers congested at the apex of the stem; stems dark brown, densely scaberulous.....**152. praticola**
 Flowers not congested at the apex of the stems; stems not densely scaberulous:
 Corolla 2-2.5 cm. long; cauline leaves spatulate.....**153. aphrosperma**
 Corolla up to 1.4 cm. long; cauline leaves ovate.....**142. parvula**
 Flowers pedicellate, solitary; stem not densely scaberulous:
 Calyx-tube with distinct transparent ribs alternating with the vascular bundles below the lobes:

Plicae nearly as long as the corolla-lobes :

Stem glabrous :

Rosette leaves ovate, 6-8 mm. long ; flowers 2-2.5 cm.
long, corolla-lobes mucronate.....**154. radiata**

Rosette leaves ovate to ovate-orbicular, 12-29 mm. long ;
corolla-lobes scarcely mucronate.....**155. bella**

Stem puberulous.....**156. pubicaulis**

Plicae about half as long as the corolla-lobes :

Rosette leaves lanceolate.....**157. Piasezkii**

Rosette leaves elliptic-ovate :

Corolla 1 cm. long, 2 mm. wide ; leaves ciliolate.....
158. inconspicua

Corolla 1.5 cm. long, 0.5 mm. wide ; leaves not or scarcely
ciliolate.....**159. flexicaulis**

Calyx-tube without distinct transparent ribs alternating with
the vascular bundles below the lobes :

Leaves with a very wide scarious margin ; flowers densely
aggregated.....**160. albo-marginata**

Leaves without a wide scarious margin ; flowers not densely
aggregated :

Stems weak, ascending :

Calyx-lobes spreading ; corolla only slightly longer than
calyx.....**174. moniliformis**

Calyx-lobes erect ; corolla about twice as long as the
calyx :

Pedicels up to 1 cm. long :

Cauline leaves orbicular.....**158. inconspicua**

Cauline leaves ovate.....**161. stellulata**

Pedicels over 1 cm. long :

Cauline leaves ovate or lanceolate, acute, scarcely
4 mm. in length :

Calyx-lobes less than half the length of the tube ;
cauline leaves more or less adpressed to the
stem.....**162 Forrestii**

Calyx-lobes equalling the tube ; cauline leaves
recurved.....**163. myrioclada**

Cauline leaves obtuse or subobtuse, larger :

Plicae truncate ; leaves sessile.....**164. Mairei**

Plicae acute ; leaves shortly petiolate.....
165. vandellioides

Stems more or less rigid ; pedicels short or flowers sessile :

I. Cauline leaves obovate-spathulate or suborbicular, rounded and
sometimes mucronate at the apex :

Corolla less than 1 cm. long.....**166. riparia**

Corolla exceeding 2 cm. long :

Flowers sessile ; cauline leaves decreasing in size towards the
base of the stem, suborbicular, the upper ones 6 mm. wide,
the lower ones very small.....**167. nanobella**

- Flowers pedicellate ; cauline leaves not markedly decreasing in size towards the base of the stem, spatulate, rarely exceeding 3 mm. in width.....**168. pudica**
- II.** Cauline leaves lanceolate or ovate, attenuate at the apex :
 Leaves without a cartilaginous border.....**169. Loureirii**
 Leaves with a cartilaginous border :
 Plant densely clothed with papillae, which are very conspicuous on the under-side of the midrib and margins of the leaves
170. papillosa
 Plant not clothed with papillae, or papillae present on the stem only ; leaves glabrous :
 Calyx-lobes subpatent, rosette leaves usually none.....
171. alsinoides
 Calyx-lobes erect, rosette leaves usually present :
 Stem simple ; leaves small, distant, mucronate, recurved
172. maeulchanensis
 Stem branched ; leaves not recurved :
 Rosette leaves narrow, lanceolate, attenuate, 3-5 cm. long.....**173. heterostemon**
 Rosette leaves ovate, rarely exceeding 1.5 cm. in length :
 Corolla-lobes caudate.....**175. chungtienensis**
 Corolla-lobes not caudate :
 Plicae triangular, acute :
 Fruit not exserted on a long stipe.....**176. pedata**
 Fruit exserted on a long stipe :
 Style absent or nearly so ; uppermost 3 mm. of filaments free ; leaves lanceolate.....
177. macrauchena
 Style about 2 mm. long ; uppermost 6-7 mm. of filaments free ; leaves ovate.....
178. subuniflora
 Plicae more or less truncate or obtuse ; fruit not or scarcely exserted :
 Flowers 4-9 mm. long, plant minute with very closely imbricate leaves :
 Stamens equal in length.....
179. Franchetiana
 Stamens unequal in length.....**180. exigua**
 Flowers 10-15 mm. long ; plant larger ;
 Leaves not imbricate ; stamens unequal in length.....**181. anisostemon**
 Leaves closely imbricate ; stamens equal in length :
 Stem glabrous.....**182. tatsienensis**
 Stem minutely scabrid, reddish brown.....
183. taliensis

IMPERFECTLY KNOWN SPECIES.

184. G. sutchuenensis.

ENUMERATION OF SPECIES AND VARIETIES.

Sect. I. **OTOPHORA** *Kusnez.* in Act. Hort. Petrop. **15**, 246 (1898); Marquand in Journ. Roy. Hort. Soc. **57**, 190 (1932).

Ser. i. **OTOPHORAE** *Marquand*, series nova.

Plantae dense caespitosae ; folia caulina numerosa.

1. G. otophora *Franch. apud Hemsl.* in Journ. Linn. Soc., Bot. **26**, 130 (1890) ; *Kusnez. Monogr.* 247.

N.W. Yunnan and the adjoining parts of S.E. Tibet and N.E. Upper Burma.—In rocky alpine meadows and marshes, 3200–4200 m.—*Delavay* 1236 ; *Forrest* 3824, 6825, 11530, 14687, 19062, 24944, 27222 ; *Handel-Mazzetti* 8420, 9914 ; *Rock* 6356 ; *Schneider* 3050.

2. G. otophoroides *H. Sm.* in Anz. Akad. Wiss. Wien, Math.-Nat. 1926, **63**, 101 (*Hand.-Mazz. Pl. Nov. Sin., Fortsetz.* **40**, 7) ; et in *Hand.-Mazz. Symb. Sin.* **7**, 971 (1936).

N.W. Yunnan and the borders of Tsarong in S.E. Tibet and Upper Burma.—In open moist alpine meadows on mica-schist soil, 4000–4500 m.—*Farrer* 1883 ; *Forrest* 20229, 22930 ; *Handel-Mazzetti* 9894.

3. G. damyonensis *Marquand* in Kew Bull. 1928, 51 ; et in Journ. Roy. Hort. Soc. **57**, 190 (1932).

S.W. Szechwan.—Alpine pastures at Damyon, 4800–5200 m.—*Kingdon Ward* 5377.

This species has also been found outside the area covered by this paper, on the Tibet-Burma frontier, on rocky turf slopes which are more or less covered with dwarf *Rhododendron* in the valley of the Seinghku (82° 10' N., 97° 20' E.), *Kingdon Ward* 7591 ; and in Tibet, *Kingdon Ward* 10099.

4. G. sichitoënsis *Marquand* in Kew Bull. 1928, 56.

S.E. Tibet.—On open alpine meadows on the Salwin-Kiu-chiang divide north-west of Si-chi-to in Tsarong, 4200 m.—*Forrest* 22794.

Also found on the Tibet-Burma frontier in the Valley of the Seinghku, on steep alpine turf slopes, 3400–3600 m.—*Kingdon Ward* 7591.

Ser. ii. **DECORATAE** *Marquand*, series nova.

Plantae haud caespitosae ; folia caulina pauca.

5. G. caryophyllea *H. Sm.* in Anz. Akad. Wiss. Wien, Math.-Nat. 1926, **63**, 101 (*Hand.-Mazz. Pl. Nov. Sin., Fortsetz.* **40**, 7) ; et in *Hand.-Mazz. Symb. Sin.* **7**, 970 (1936).

N.E. Upper Burma or Yunnan.—In the neighbourhood of the Gomba-La and on the N'Maikha-Salwin divide, on open stony alpine meadows and grassy slopes and schistose soil, 3400–4200 m.—*Farrer* 1185, 1890 ; *Forrest* 24946 ; *Handel-Mazzetti* 9876.

6. *G. tsarongensis* Balf. f. et Forrest ex Marquand in Kew Bull. 1928, 62.

S.E. Tibet.—Tsarong, on the Doker La and the Salwin-Kiu-chiang divide, on damp stony pastures, 3900 m.—*Forrest* 14567, 18997, 19053, 22790.

7. *G. decorata* Diels in Notes Roy. Bot. Gard. Edinb. 5, 220 (1912).

Yunnan.—Mekong-Salwin divide, on open stony pasture, 3900 m.—*Forrest* 3021, 3827, 6940, 20719; *Rock* 6276, 6345; *Kingdon Ward* 107.

Sect. II. **STENOGYNE** Franch. ex Kusnez. in Act. Hort. Petrop. 15, 248 (1898); Marquand in Journ. Roy. Hort. Soc. 57, 191 (1932).

8. *G. Kusnezowii* Franch. in Bull. Soc. Bot. France, 43, 492 (1896).

Yunnan.—Near Mengtze, in upland grassy downs at 2000 m.—*Hancock* 43; *Henry* 10023.

9. *G. rhodantha* Franch. apud Hemsl. in Journ. Linn. Soc., Bot. 26, 133 (1890); Kusnez. Monogr. 251.—*G. Jankae* Kanitz, Plant. Exped. Széchenyi a de Lóczy in As. Centr. Coll. 41 (1891).

Yunnan and Hupeh, Western Szechwan and Kweichow.—Calcareous meadows and clefts of rocks, on the edges of dry pine woods and similar situations, 400–3500 m.—*Cavalerie* 561, 631; *Ducloux* 518; *Delavay* 1869; *Esquirol* 229, 285; *Hancock* 10781; *Henry* 508, 964, 2990, 4606, 9832, 9836, 12767, 12767a; *Kingdon Ward* 4978, 4998; *Maire* 904, 1513; *Rock* 11581.

10. *G. striata* Maxim. in Bull. Acad. Sc. Pétersb. 27, 501 (1881); Mém. Biol. 11, 265; Kusnez. Monogr. 250.—*G. tricholoba* Franch. in Bull. Soc. Bot. France 43, 490 (1896). *G. Schlechteriana* Limpr. f. in Fedde Repert. Beih. 12, 467 (1922).

Kansu and N.E. Tibet.—On open ground and grassy slopes.—*Ching* 815; *Cunningham* 354; *Fang* 4335; *Farrer* 724; *Licent* 4772; *Rock* 14863; *Wilson* (Veitch Exped.) 4144, 4144a.

11. *G. filicaulis* Hemsl. in Journ. Linn. Soc., Bot. 26, 127 (1890); Kusnez. Monogr. 253.

Hupeh.—In the neighbourhood of Fang, not seen from elsewhere and habitat not stated by original collector.—*Henry* 6842.

Note. This species shows some transition to Section *Dipterospermum* in the twisting of the stem.

12. *G. Souliei* Franch. in Bull. Soc. Bot. France, 43, 491 (1896).

E. Szechuan.—In wet places around Tongolo and Dzeura.—*Soulié* 194.

var. **flavo-viridis** *Marquand*—**G. pterocalyx** var. **flavo-viridis** *Marquand* in Kew Bull. 1928, 54.

N.W. Yunnan.—Eastern flank of Lichiang Range, 27° 30' N., in open stony pastures, 3400 m.—*Forrest* 6531, 15116; *Schneider* 2340, 3002, 3135; *Rock* 11450.

13. G. eurycolpa *Marquand* in Kew Bull. 1931, 71.

Yunnan.—On grassy mountains, 2400–3000 m.—*Henry* 10023; *Maire* in *Herb. Bonati* 2910, 7404.

14. G. primuliflora *Franch.* in Bull. Soc. Bot. France, **31**, 375 (1884); *Kusnez. Monogr.* 253.

Yunnan.—On open moist pasture on the Tali Range at 3900 m.—*Delavay* sine no.; *Ducloux* 570; *Forrest* 15526; *Maire* 1516; *Siméon Ten* 11.

15. G. gentilis *Franch.* in Bull. Soc. Bot. France, **43**, 491 (1896).

Yunnan.—Mountain pastures, on open hillsides, 3000–4800 m.—*Delavay* sine no. anno 1883–85; *Ducloux* 800.

16. G. pulchra *H. Sm.* in Hand.-Mazz. Symb. Sin. **7**, 951 (1936).

Yunnan.—Lichiang range, 2425–2500 m.—*Handel-Mazzetti* 3751; *Forrest* 2493; *McLaren* “N” 230; *Rock* 5032, 6174, 7788, 10715, 10748, 10839, 10878, 17253.

17. G. serra *Franch.* in Bull. Soc. Bot. France, **31**, 376 (1884); *Kusnez. Monogr.* 252.

Yunnan.—In grassland on the mountains, 2500–3000 m.—*Delavay* 1238; *Forrest* 301, 3040; *Henry* 10023 in *Herb. Kew.*, non in *Herb. Edinb.*; *Kingdon Ward* 5000; *Limpricht* 1138; *Schneider* 3707.

18. G. leptoclada *Balf. f. et Forrest* in Notes Roy. Bot. Gard. Edinb. **4**, 71, t. 14 (1907).

Yunnan.—Valley of the Yangtze above Shiti Ko, 2100–2700 m.—*Forrest* 409.

19. G. hapalocaula *Marquand* in Kew Bull. 1928, 52.

N.W. Yunnan.—On the Tong shan in the Yangtze bend, 27° 20' N., 3000 m., Oct. 1913, amongst grass in open situations.—*Forrest* 11444.

20. G. expansa *H. Sm.* in Hand.-Mazz. Symb. Sin. **7**, 951 (1936).

Yunnan.—In surroundings of the woods near Nigu near Tieso (alt. not stated).—*Ten* 282 (type in *Herb. Berol.*), 1393; *Ducloux* 4875.

21. **G. pterocalyx** Franch. in Journ. Linn. Soc., Bot. 26, 132 (1890); Kusnez. Monogr. 252; Marquand in Journ. Roy. Hort. Soc. 57, 191 (1932).

Yunnan.—*Delavay*, sine no. ; *Forrest* 15116.

Sect. III. **DIPTEROSPERMUM** (C. B. Clarke) Marquand in Kew Bull. 1931, 69; et in Journ. Roy. Hort. Soc. 57, 191 (1932).—*Crawfurdia*, subgenus *Dipterospermum* C. B. Clarke in Journ. Linn. Soc., Bot. 14, 442 (1875); et in Hook. f. Fl. Brit. Ind. 4, 106 (1883).

22. **G. bomareoides** Marquand in Kew Bull. 1931, 73.

N.E. Upper Burma*.—N'Maikha-Salwin Divide, 26° 45' N., 98° 48' E., on scrub and grassland, 2100-2400 m.—*Forrest* 27558.

23. **G. crawfurdioides** Marquand in Kew Bull. 1931, 72.

S.E. Tibet.—Tsarong, Mekong-Salwin divide and Shweli-Salwin divide, on scrub and grass in open dry situations, 2100—2400 m.—*Forrest* 14789, 16880.

var. **macrophylla** Marquand in Kew Bull. 1931, 73.

N.E. Upper Burma*.—N'Maikha-Salwin divide, 26° 45' N., 98° 48' E., 3400-3600 m.—*Forrest* 27442.

24. **G. fratris** Marquand in Kew Bull. 1931, 70.—*Crawfurdia Delavayi* Franch. in Bull. Soc. Bot. France, 46, 306 (1899).

Yunnan.—Tsang, Lichiang and Muli mountains, on grass and scrub, 3000-3600 m.—*Delavay*, sine no.

25. **G. iochroa** Marquand in Kew Bull. 1931, 74.

S.E. Tibet.—Tsarong, Salwin-Kiu-chiang divide, 28° 40' N., 98° 15' E., in open pastures on the margins of forests.—*Forrest* 18974.

26. **G. curviflora** Marquand in Kew Bull. 1931, 74.

S. Szechwan.—Muli, on shady limestone cliffs, 2700-3000 m.—*Kingdon Ward* 4880.

27. **G. discoidea** Marquand in Kew Bull. 1931, 72.

W. Hupeh.—Patung district, on the mountains near Ningpo and elsewhere, not precisely localized.—*Henry* 1038, 2848, 4877; *Wilson* (Veitch Exped.) 1742.

28. **G. khamensis** Marquand in Kew Bull. 1931, 70.—*Crawfurdia tibetica* Franch. in Bull. Soc. Bot. France, 46, 307 (1899); non *Gentiana tibetica* King ex Hook. f. (1883).

W. Szechwan.—Ta-tsien-lu.—*Soulié* ; *Wilson* (Veitch Exped.) 2453.

* These are inserted as they occur near the Chinese frontier.

29. *G. semialata* Marquand in Kew Bull. 1931, 75.

W. Szechwan.—Litang-Yalung divide, on limestone cliffs, 3600 m.—*Kingdon Ward* 4984.

30. *G. sessiliflora* Marquand in Kew Bull. 1931, 76.

W. China.—Probably W. Szechwan, precise locality unknown.—*Wilson* (Veitch Exped.) 4150.

31. *G. Heleni* Marquand in Kew Bull. 1931, 69 ; et in Journ. Roy. Hort. Soc. **57**, 192 (1932).—*Crawfurdia Trailliana* Forrest in Notes Roy. Bot. Gard. Edinb. **17**, 76 (1907); non *Gentiana Trailliana* Forrest (1907).

N.W. Yunnan.—Salwin-Irrawadi divide, Shweli-Salwin divide and neighbourhood, in damp shady situations on tall grass and scrub, 1500-2100 m.—*Forrest* 963, 9422, 16169, 25997.

32. *G. cordata* Marquand in Kew Bull. 1931, 77.

Yunnan.—Yeng Chen Lin Mountain.—*Henry* 11186.

W. Szechwan.—Mount Omei and the neighbourhood of Ta-tsienu, 1500-2100 m.—*Faber* 171, 293 ; *Henry* 8881 ; *Pratt* 431 ; *Wilson* (Veitch Exped.) 4151, 5105, 5105A (type).

33. *G. membranacea* Marquand in Kew Bull. 1931, 75.

N.E. Upper Burma*.—26° 23' N., 98° 48' E., on scrub and cane brakes on the margins of thickets.—*Forrest* 25060.

34. *G. cyanea* Marquand, nom. nov.—*Crawfurdia coerulea* Hand.-Mazz. in Hand.-Mazz. Symb. Sin. **7**, 950 (1936); non *Gentiana coerulea* Moc. et Sessé (1887-90).

Szechwan.—Between Yenyüen and Kwapi, climbing among bamboos, 3050 m.—*Handel-Mazzetti* 5556.

35. *G. Nienkui* Marquand in Kew Bull. 1931, 76.

Hongkong.—In a wood.—*N.K. Chun* 40111.

36. *G. caudata* Marquand in Kew Bull. 1931, 78.

Szechwan.—N. Wushan.—*Henry* 7091.

37. *G. fascicularis* Marquand in Kew Bull. 1931, 70.—*Crawfurdia fasciculata* Wall. Tent. Fl. Nep. **63**, t. 47 (1826) ; non *Gentiana fasciculata* Hayata (1908).

Kiangsi.—Kuling Lu Shan.—*Steward* 2732.

Hupei.—Fang (habitat and altitude unknown).—*Henry* 6654A.

38. *G. Bulleyana* (*Forrest*) Marquand, comb. nov.—*Crawfurdia Bulleyana* Forrest in Notes Roy. Bot. Gard. Edinb. **4**, 77 (1907).

Upper Burma.—Ming-kwong-Irrawaddi and Irrawaddi-Salwin divides, in bamboo brakes and on scrub, 2400-3400 m.—*Forrest* 839.

* This species is included as it occurs near the Chinese frontier.

39. *G. Pricei* Marquand in Kew Bull. 1931, 75.

Fukien, Kwangsi and Kwangtung.—Open mountainous country, 1000 m.—*Price* 1169 (type); *Ko* 53593, 53689 ; *Kwangsi Museum* (collector not noted) 255.

40. *G. dimidiata* Marquand in Kew Bull. 1931, 77.

Yunnan.—Shweli-Salwin divide, on cane brakes and scrub, 3400 m.—*Forrest* 25225.

Sect. IV. **TRIPTEROSPERMUM** (*Bl.*) *Marquand* in Kew Bull. 1931, 70 ; et in Journ. Roy. Hort. Soc. **57**, 192 (1932).—*Tripterospermum* Blume, Bijdr. 849 (1825). *Crawfurdia*, subgenus *Tripterospermum* C. B. Clarke in Journ. Linn. Soc., Bot. **14**, 442 (1875); et in Hook. f. Fl. Brit. Ind. **4**, 107 (1883).

41. *G. trinervis* (Thunb.) Marquand, comb. nov.—*Convolvulus trinervis* Thunb. Fl. Jap. 85 (1784). *Crawfurdia japonica* Sieb. et Zucc. in Abh. Akad. Muench. **4**, pt. 3, 160 (1846). *Golowninia japonica* (Sieb. et Zucc.) Maxim. in Bull. Acad. Pétersb. **4**, 252 (1862) ; Mél. Biol. **4**, 41. *Crawfurdia trinervis* (Thunb.) Mak. in Bot. Mag. Tokyo, **16**, 171 (1902), non D. Dietr. *Gentiana Golowninia* Marquand in Kew Bull. 1931, 70 ; et in Journ. Roy. Hort. Soc. **57**, 192 (1932).

var. ***oblonga* Marquand**, comb. nov.—*G. Golowninia* var. *oblonga* Marquand in Kew Bull. 1931, 79.

Kweichow and Hupeh.—On open hillsides, 450 m.—*Henry* 7416 ; *Tsiang* 4637, 7559 ; *Wilson* (Veitch Exped.) 1687.

42. *G. luteo-viridis* C. B. Clarke in Journ. Linn. Soc., Bot. **14**, 443 (1875).—*Crawfurdia japonica* Sieb. et Zucc., var. *luteo-viridis* C. B. Clarke in Hook. f. Fl. Brit. Ind. **4**, 108 (1883).

Yunnan, Kweichow, Hupeh.—Climbing trees in dry ravines, 400-500 m.—*Cavalerie* 414, 469 ; *Henry* 95, 2661, 9474 ; *Silvestri* 1827, 9474.

Sect. V. **FRIGIDA** *Kusnez.* in Act. Hort. Petrop. **13**, 61 (1893) ; *Marquand* in Journ. Roy. Hort. Soc. **57**, 193 (1932).

Ser. i. **VERTICILLATAE** *Marquand* in Journ. Roy. Hort. Soc. **57**, 193 (1932), in clavi.

Perennes ; folia verticillata, 3-7-nata, angusta ; flores magni, terminales, solitarii.

43. *G. ternifolia* Franch. in Bull. Soc. Bot. France, **31**, 377 (1884); *Kusnez.* Monogr. 269.

Yunnan and N.W. Szechwan.—On mountains, 3000-4100 m.—*Delavay* 1240 ; *Fang* 3551 ; *H. Smith* 4256, 4258, 4569.

44. *G. tetraphylla* Kusnez. ex Maxim. in Mél. Biol. **13**, 338 (1892) et in Bull. Acad. Pétersb. **35**, 350 (1894); Kusnez. Monogr. 270.

N.W. Szechwan and S.W. Kansu.—3600–4500 m.—Potanin sine no.; *Rock* 14638; *Wilson* (Veitch Exped.) 4143a.

45. *G. quaterna* H. Sm. in Kew Bull. 1937, 125.

N.W. Szechwan.—Alpine meadows, 3600–4100 m.—*H. Smith* 4210, 4249.

Dr. Harry Smith considers this to be of hybrid origin, and describes one variety and two subspecies under it.

46. *G. ecaudata* Marquand in Kew Bull. 1928, 51.

S.E. Tibet, Tsarong.—On open moist moorland on the Salween-Kiu-chiang divide, north-west of Si-chi-to, 38° 48' N., 98° 15' E., 4500 m.—*Forrest* 22797.

47. *G. viatrix* H. Sm. in Kew Bull. 1937, 127.

N.W. Szechwan.—Matang, on open alpine meadows, 4800 m.—*H. Smith* 4345.

48. *G. subocculata* Marquand in Kew Bull. 1931, 81.

N.W. Yunnan and S.E. Tibet.—In open moist stony meadows, 3600–4200 m.—*Forrest* 405, 19103, 20746, 25954; *Rock* 17266.

49. *G. heptaphylla* Balf. f. et Forrest in Notes Roy. Bot. Gard. Edinb. **4**, 72, t. 13 (1907), emend. Marquand in Kew Bull. 1931, 81.

N.W. Yunnan and S.E. Tibet.—In bare dry grassland on mountain summits, 4500–4800 m.—*Forrest* 45, 14746.

50. *G. hexaphylla* Maxim. ex Kusnez. in Mél. Biol. **13**, 337 (1892), et in Bull. Acad. Pétersb. **35**, 349 (1894); Kusnez. Monogr. 270; Marquand in Journ. Roy. Hort. Soc. **57**, 194 (1932); Wilkie, Gentians, **75**, fig. 40 (1936).

W. Kansu and W. Szechwan.—On grassy slopes of the mountains, 3000–3600 m.—*Farrer* 217; *Potanin* sine no.; *Purdum* sine no.; *Kingdon Ward* 4638.

var. ***caudata* Marquand** in Kew Bull. 1931, 81.

Kansu.—Upper Kar Ching K'ou, near Old Taochow, 3800–4300 m.—*Ching* 870; *Rock* 13736.

var. ***pentaphylla* H. Sm.** in Hand.-Mazz. Symb. Sin. **7**, 974 (1936).

Shensi.—Between Toumengung and Fangyangse.—*Licent* 2840.

51. *G. Arethusae* Burkill in Journ. Proc. As. Soc. Beng. n. s. **2**, 309 (1906).

Shensi, W. Kansu and W. Szechuan.—On mountain summits, 3000 m.—*Giraldi* sine no.; *Farges* sine no.; *Licent* 2840, 2892; *Limpricht* 2341, 2358; *Purdum* 528; *Rock* 16853.

var. **delicatula** *Marquand* in Kew Bull. 1931, 81.

S.E. Tibet.—Tsarong, Doker-La, Mekong-Salwin divide, 28° 20' N., on moist stony pastures, 4200 m.—*Forrest* 14854.

var. **rotundato-lobata** *Marquand* in Kew Bull. 1931, 82.

N.W. Yunnan.—Mekong-Salwin divide, 27° 30' N., 98° 56' E., on open moorland, 4200 m.—*Forrest* 20766.

SER. II. ORNATAE *Marquand* in Journ. Roy. Hort. Soc. **57**, 193 (1932), in clavi.

Perennes ; folia opposita, angusta ; flores magni, terminales, solitarii.

52. G. Veitchiorum *Hemsl.* in Gard. Chron. **46**, 178 (1909) ; *Marquand* in Journ. Roy. Hort. Soc. **57**, 195 (1932) ; *Wilkie*, Gentians, 138, fig. 81. (1936)—*G. ornata* *Wall.* var. *acutifolia* *Franch.* in Bull. Soc. Bot. France, **43**, 494 (1896).

W. Szechwan and E. Tibet.—In alpine meadows and marshy moorland, 3000–5000 m.—*Cunningham* 303 ; *Forrest* 6707, 17015, 20875 ; *Hosie* sine numero ; *Handel-Mazzetti* 8752 ; *Rock* 11523, 18239 ; *Soulié* 67, 681 ; *Wilson* (*Veitch Exped.*) 4141, 4143, 4143b.

var. **caelestis** *Marquand* in Kew Bull. 1931, 84.—*G. caelestis* (*Marquand*) *H. Sm.* in Hand.-Mazz. Symb. Sin. **7**, 972 (1936), as "*G. coelestis*."

N.W. Yunnan.—On the Lichiang Range and neighbouring mountains, in alpine meadows and among limestone rocks, 3000–4000 m.—*Handel-Mazzetti* 8752, *Maire* 2722 ; *Rock* 7785, 8752, 10763, 10858.

var. **altorum** (*H. Sm.*) *Marquand* comb. nov.—*G. altorum* *H. Sm.* in Kew Bull. 1937, 129.

W. Szechwan.—Sikang, Taofu district, in alpine meadows, 4200–5000 m.—*H. Smith* 11699, 12534, 12535, 12536, 13927, 13931, 13932.

53. G. oreodoxa *H. Sm.* in Anz. Akad. Wiss. Wien, Math.-Nat. 1926, **63**, 99 (*Hand.-Mazz. Pl. Nov. Sin. Fortsetz.* **40**, 5) ; et in *Hand.-Mazz. Symb. Sin.* **7**, 973 (1936).

Yunnan.—On the Mekong-Salwin divide, in open moist pastures, 4200–4400 m.—*Forrest* 14843 ; *Handel-Mazzetti* 8431.

54. G. Futtereri *Diels et Gilg ex Diels* in *Futterer, Durch Asien, Bot.*, reimpr. **14** (1903).

W. Kansu and W. Szechwan.—In bogs, 3300–3860 m.—*Licent* 4794 ; *Wilson* (*Veitch Exped.*) 4141a, 4142.

55. G. Farreri *Balf. fil.* in Trans. Proc. Bot. Soc. Edinb. **27**, 248 (1918) ; *Marquand* in Journ. Roy. Hort. Soc. **57**, 198 (1932) ; *Wilkie*, Gentians, 61, fig. 32, 33 (1936).

N.E. Tibet, Kansu and N.W. Szechwan.—On mountains, 4100–4500 m.—*Ching* 986 ; *Cunningham* 303 ; *Farrer* sine no. ; *French Ridley* 21 ; *Kingdon-Ward* 4859 ; *Rock* 14862.

56. *G. sino-ornata* Balf. f. in Trans. Proc. Bot. Soc. Edinb. **27**, 253 (1918) ; Marquand in Journ. Roy. Hort. Soc. **57**, 197 (1932) ; Wilkie, Gentians, 125, fig. 66, 67 and frontispiece (1936).

N.W. Yunnan, S.W. Szechwan, S.E. Tibet and N.W. Upper Burma.—In moist alpine meadows, 2400–5000 m.—*Farrer* 1400 ; *Forrest* 408, 3028, 6728, 7374, 13549, 15114, 15186, 15355, 22486, 22602 ; *Kingdon Ward* 101 McLaren “N” 220 ; *Schneider* 384, 2699 ; *Rock* 7769, 7771, 10816, 10842, 10874, 11400, 11478, 11570, 11668, 17244, 17355.

forma **alba** (*Forrest*) *Marquand*, stat. nov. floribus albis tantum distincta.—*G. ornata* var. *alba* *Forrest* in Notes Roy. Bot. Gard. Edin. **4**, 72 (1907).

Yunnan.—Yangtze-Mekong divide, 4200 m.—*Forrest* 24, 408, 11447 ; *Rock* 11568.

var. **punctata** *Marquand* in Kew Bull. 1931, 84.

N.W. Yunnan and N.E. Upper Burma.—In open moist stony alpine meadows, 3400–4500 m.—*Forrest* 22602, 25423, 27450, 27749 ; *Kingdon Ward* 7586 ; *Rock* 18346.

var. **gloriosa** *Marquand* in Kew Bull. 1928, 57.

S.W. Szechwan.—Mountains east of Yungning, 27° 50' N., 100° 56' E., 3400–3600 m.—*Forrest* 20640.

57. *G. helophila* Balf. f. et *Forrest* ex *Marquand* in Kew Bull. 1928, 60.

N.W. Yunnan.—Lei-lung-shan.—*Forrest* 15187.

Ser. iii. SUBORBISEPALAE *Marquand*, series nova.

Perennes ; folia opposita, laxa ; flores solitarii, terminales ; calycis lobi suborbiculares vel spathulati ; corollae tubus fauce constrictus.

58. *G. stragulata* Balf. f. et *Forrest* ex *Marquand* in Kew Bull. 1928, 61 ; *Marquand* in Journ. Roy. Hort. Soc. **57**, 200 (1932) ; Wilkie, Gentians, 129, fig. 70 (1936).

N.W. Yunnan and S.E. Tibet.—In moist stony moorland and peaty pastures, 3000–4000 m.—*Forrest* 12890, 13318, 14636, 14872, 19060, 19224, 21008 ; *Monbeig* sine no. ; *Rock* 11595, 18344.

59. *G. tongolensis* Franch. in Bull. Soc. Bot. France, **43**, 490 (1896).

S.W. Szechwan and N.W. Yunnan.—Muli and the Mekong-Salwin divide ; in meadows, 3950 m.—*Cunningham* 341 ; *Forrest* 13371 ; *Kingdon Ward* 4691, 4722, 4804 ; *Rock* 18238 ; *Soulié* 203.

60. *G. suborbisepala* *Marquand* in Kew Bull. 1928, 58.

S.W. Szechwan.—Tongolo and Litang-Yalung divide, on open shrub-clad slopes, 3600–4100 m.—*Cunningham* 312 ; *Kingdon Ward* 4941 ; *Rock* 16758.

Ser. iv. CONFERTIFOLIAE *Marquand*, series nova.

Perennes; folia opposita, imbricata, latiora, margine cartilagineo; flores solitarii, terminales; corollae tubus fauce haud constrictus.

61. *G. confertifolia* *Marquand* in Kew Bull. 1928, 50.

N.W. Yunnan.—Yungning, on sunny limestone cliffs, 3000–3400 m.—*Kingdon Ward* 5058.

62. *G. Georgei* *Diels* in Notes Roy. Bot. Gard. Edinb. 5, 221 (1912); *Marquand* in Journ. Roy. Hort. Soc. 57, 199 (1932); Wilkie, Gentians, 69, fig. 35, 36 (1936).

Yunnan and S.E. Tibet.—In open stony pastures and alpine moorland, 2000–4800 m.—*Farrer* 267; *Forrest* 3110, 7355, 11464, 15185, 22984; *Kingdon Ward* 104, 1133, 4988; *Rock* 11409, 11655, 17264, 17329, 18530.

63. *G. Szechenyii* *Kanitz*, Pl. Exped. Széchenyi in As. Centr. coll. 40 (1891); *Kusnez. Monogr.* 267.—*G. rosularis* *Franch.* in Bull. Soc. Philom. Paris, Sér. 8, 3, 148 (1891). *G. callistantha* *Diels et Gilg* in *Futterer, Durch Asien, Bot.*, reimpr. 14 (1903).

W. Szechwan.—*Wilson* (Veitch Exped.) 4145.

64. *G. tizuensis* *Franch.* in Bull. Soc. Bot. France, 43, 494 (1896).

W. Szechwan.—Tizou and Tongolo.—*Cunningham* 314; *Kingdon Ward* 5398; *Soulié* 368.

Ser. v. UNIFLORAE *Marquand*, series nova.

Perennes; caudex crassus; folia opposita, imbricata, latiora; calycis lobi haud in basin attenuati; flores solitarii, terminales; corollae tubus fauce haud constrictus sed leviter expansus.

65. *G. phyllocalyx* *C. B. Clarke* in Hook. f. Fl. Brit. Ind. 4, 116 (1883); *Kusnez. Monogr.* 288; Wilkie, Gentians, 100, fig. 55 (1936).

N.W. Yunnan, S.E. Tibet (Tsarong) and N.E. Upper Burma.—Open moist alpine meadows and moist moorlands, 3900–4500 m.—*Farrer* 1148, 1703; *Forrest* 401, 402, 3831, 3832, 7130, 14276, 14682, 14826, 19816, 20227, 20612, 22301, 22782, 22786, 26957; *McLaren* "N" 83; *Monbeig* sine no.; *Kingdon Ward* 859, 945, 4240, 4665, 5387; *Rock* 9680, 16863.

66. *G. filistyla* *Balf. f. et Forrest ex Marquand* in Kew Bull. 1928, 60.

N.W. Yunnan and S.E. Tibet.—Yangtze-Mekong and Mekong-Salwin divides, and Ka-gwr-pu in Tsarong, on moist stony pastures, up to 4500 m.—*Forrest* 14338, 14561, 16882; *Rock* 10342.

67. *G. Wardii* *W. W. Sm.* in Notes Roy. Bot. Gard. Edinb. 7, 122 (1913).

N.W. Yunnan and S.E. Tibet.—In marshy, boggy moorland, 4500 m.—*Forrest* 13165, 14560, 16874, 19057, 19980, 20280; *Kingdon Ward* 103, 5335.

68. *G. emergens* Marquand in Kew Bull. 1931, 82.

S.W. Szechwan.—Mount Mitzuga, west of Muli Gomba, on rocks and boulders, 3050–4875 m.—*Rock* 16591.

69. *G. altigena* H. Sm. in Anz. Akad. Wiss. Wien, Math.-Nat. **63**, 99 (1926) (Hand.-Mazz. Pl. Nov. Sin. Fortsetz. **40**, 5); et in Hand.-Mazz. Symb. Sin. **7**, 972 (1936).

N.W. Yunnan.—On the Salwin-Irrawaddi divide, on mountain slopes of Gomba-la above Tschamatong towards the pass of Tsukue, above 4200 m.—*Handel-Mazzetti* 9878.

Ser. vi. SIKKIMENSES *Marquand*, series nova.

Perennes; flores numerosi, \pm congesti; folia radicalia conspicua; folia caulina opposita.

70. *G. chinensis* Kusnez. in Mém. Biol. **13**, 338 (1892), et in Bull. Acad. Pétersb. **35**, 350 (1894); Kusnez. Monogr. 277.

W. Szechwan.—Mount Omei summit, Wushan summit, in woodland glades, and stony places.—*Faber* 294; *Fang* 2847; *Henry* 8867; *Maire* sine no.; *Pratt* 154, 159, 435; *Wilson* (Veitch Exped.) 4127, 5107; (Arn. Arb. Exped.) 2454; *Rock* 17323.

71. *G. Harrowiana* Diels in Notes Roy. Bot. Gard. Edinb. **5**, 22 (1912).

Yunnan.—Tali range, on open rocky mountain pastureland, 3400–3600 m.—*Farrer* 1889; *Forrest* 3825.

72. *G. sikkimensis* C. B. Clarke in Hook. f. Fl. Brit. Ind. **4**, 114 (1883); Kusnez. Monogr. 276; Marquand in Journ. Roy. Hort. Soc. **57**, 200 (1932); Wilkie, Gentians, 123, fig. 69 (1936)—*G. pseudo-sikkimensis* Marquand ex Wilkie loc. cit. 163.

Yunnan and S.E. Tibet.—On open moist stony slopes and moist pinewoods, 5000 m.—*Farrer* 1401; *Forrest* 55, 3829, 6878, 19050, 20319.

73. *G. streptopoda* Balf. f. et Forrest ex Marquand in Kew Bull. 1928, 61.

N.W. Yunnan and N.E. Upper Burma.—Tali Range, Mekong-Yangtze divide and N' Maikha-Salwin divide, in moist alpine meadows, 4500 m.—*Delavay* 139; *Forrest* 14827, 27451, 27544; *Schneider* 3052; *Rock* 6322.

Ser. vii. MULTIFLORAE *Marquand*, series nova.

Perennes; flores numerosi; folia radicalia nulla.

74. *G. microdonta* Franch. apud Hemsl. in Journ. Linn. Soc., Bot. **26**, 130 (1890); Kusnez. Monogr. 272; Wilkie, Gentians, 89, fig. 44.—*G. phyllopoda* Lévl. in Bull. Géogr. Bot. **24**, 21 (1915).

S. Szechwan and Yunnan.—Mount Omei, Lichiang Snow Range and Tsangshan, 2500–3500 m.—*Delavay* sine no.; *Faber* 46; *Forrest* 410, 2957, 3826, 6471, 6826, 10867, 14524; *Kingdon Ward* 971; *McLaren* “N” 138; *Monbeig* 193; *Wilson* 1028; *Rock* 5268, 6361.

75. *G. melandriifolia* Franch. apud Hemsl. in Journ. Linn. Soc., Bot. **26**, 129 (1890).

Yunnan.—On the Tang-shan, 2500–3900 m.—*Delavay* 1235; *Forrest* 3013, 3048, 7201, 11719; *Schneider* 2776, 3247. A specimen collected at an altitude of 3000 m. on the Tsang near Tali in Aug. 1914 by *Schneider* (3074a) appears to be a hybrid of this species with *G. rigescens* Franch.

76. *G. Duclouxii* Franch. in Bull. Soc. Bot. France, **46**, 305 (1899).

Yunnan.—On the hills north-west of Yunnanfu lake, 2100 m.—*Bodinier in Herb. Léveillé* 2548; *Ducloux* 320, 588, 673; *Forrest* 470, 701; *Maire* 753.

77. *G. rigescens* Franch. apud Hemsl. in Journ. Linn. Soc., Bot. **26**, 134 (1890); *Kusnez. Monogr.* 235; *Marquand in Journ. Roy. Hort. Soc.* **57**, 201 (1932); *Wilkie, Gentians*, 112, fig. 62, 63. *G. Esquirolii* Lévl. in Fedde, Repert. **12**, 183 (1913); *G. Vaniotii* Lévl. l.c. 182.

Yunnan.—*Bodinier* 31, et sine no.; *Delavay* 142; *Esquirol* 194, 701; *Forrest* 1048, 3091, 6823; *Maire* 1508; *Rock* 7213; *Schneider* 2525, 2728.

var. ***stictantha* Marquand**, var. nov.; a typo differt corollis punctatis.

Yunnan.—*Cavalerie* 421, 8253; *Ducloux* 151; *Forrest* 9224.

var. ***violacea* H. Sm.** in Hand.-Mazz. Symb. Sin. **7**, 976 (1936).

Yunnan.—*Rock* 7805; *Schneider* 2775; *Tsang* 6909.

This species was placed in Section *Pneumonanthe* by Franchet, and retained there by Kusnezow in his Monograph of *Eugentiana*, but the seeds clearly show that it belongs to Section *Frigida*, where it is allied to *G. cephalantha* Franch.

78. *G. cephalantha* Franch. apud Hemsl. in Journ. Linn. Soc., Bot. **26**, 125 (1890), *Kusnez Monogr.* 274; *Wilkie, Gentians*, 49, fig. 63—*G. pseudocephalantha* Marquand ex Wilkie, “Gentians” 163 nomen.

Yunnan, W. Szechwan and N.E. Upper Burma frontier.—In alpine meadows, 3000–3600 m.—*Delavay* sine no.; *Farrer's orderly* 1391; *Forrest* 28, 700, 2990, 3007, 7221, 7369, 10502, 11362; *McLaren* “N” 221; *Maire* 911, 912, 1519; *Wilson* (Veitch Exped.) 4128.

79. *G. Davidi* Franch. Pl. David. 211 (1884); *Kusnez. Monogr.* 273.

Fukien and S.W. Chekiang.—On open mountain slopes.—*Carles* 676 ; *Cavalerie* 365 ; *David* sine no. ; *Price* 1162.

80. *G. Atkinsonii* *Burkill* in Journ. Proc. As. Soc. Beng. n.s. **2**, 309 (1906).

Kwangtung.—Lofui mountains, 1000 m.—*Atkinson* 322.

81. *G. wasenensis* *Marquand* in Kew Bull. 1931, 80.

W. Szechwan.—Wen-chuan-sen, in alpine meadows, 3000–3600 m.—*Wilson* (Arn. Arb. Exped.) 2457.

82. *G. Purdomi* *Marquand* in Kew Bull. 1928, 55.

W. Kansu.—Minchow, 2700–3000 m.—*Purdom* sine no.

83. *G. Chingii* *Marquand* in Kew Bull. 1931, 83.

Kansu.—Ye Cheou K'ou near Old Taochow on the border of Tibet, 3300–3800 m., in dense tussocks, very common.—*Ching* 817.

84. *G. trichotoma* *Kusnez.* in Act. Hort. Petrop. **13**, 61 (1893); *Kusnez. Monogr.* 281 ; *Marquand* in Journ. Roy. Hort. Soc. **57**, 201 (1932); *Wilkie, Gentians*, 135, fig. 80. *G. Phob* *Franch.* in Bull. Soc. Bot. France, **43**, 493 (1896).

Kansu, W. Szechwan, Shensi, E. Tibet and Yunnan.—*Cunningham* 280, 307 ; *Farrer* 220 ; *Giraldi* sine no. ; *Limpricht* 2282 ; *Kingdon Ward* 4251 ; *Maire* sine no. ; *Pratt* 469 ; *Rock* 16575, 16625, 16689, 16759, 16796, 17413, 17921, 18202, 18511 ; *Wilson* (Veitch Exped.) 4138a ; (Arn. Arb. Exped.) 1028.

var. ***brevicaulis*** *Marquand* in Kew Bull. 1931, 82.

N.W. Yunnan.—On the Peima-shan, Mekong-Yangtze divide, between Atuntze and Pangtzel, 4200–4500 m.—*Rock* 10033.

85. *G. Przewalskii* *Maxim.* in Bull. Acad. Pétersb. **27**, 502 (1881); *Marquand* in Journ. Roy. Hort. Soc. **57**, 202 (1932); *Wilkie, Gentians*, 105, fig. 61. *G. algida* var. *Przewalskii* *Kusnez. Monogr.* 265.

Kansu, W. Szechwan and E. Tibet.—On bare mountains.—*Ching* 934, 945 ; *Cunningham* 302 ; *Farrer* 703 ; *Hosie* sine no. ; *Licent* 4661, 4795 ; *Przewalski* sine no. ; *Rock* 13011, 13720, 13734, 14645.

86. *G. apiata* *N. E. Brown* in Kew Bull. 1914, 187.

Shensi.—Tai-pei-shan.—*Purdom* 406.

87. *G. Wilsoni* *Marquand* in Kew Bull. 1928, 59.

W. China.—In alpine meadows.—*Wilson* (Veitch Exped.) 4138.

88. *G. atuntsiensis* *W. W. Sm.* in Notes Roy. Bot. Gard. Edinb. **7**, 121 (1913).

S.W. China.—*Monbeig* sine no.

This species has been collected subsequently outside this area by Capt. Kingdon Ward at Suiden Gompa, Nagong, Tibet, at an

altitude of 14000–15500 feet (4200–4500 m.), 18 Aug. 1933, no. 10767.

89. *G. Handeliana* *H. Sm.* in *Anz. Akad. Wiss. Wien, Math.-Nat.* 1926, **63**, 98 (*Hand.-Mazz. Pl. Nov. Sin., Fortsetz.* **40**, 4); et in *Hand.-Mazz. Symb. Sin.* **7**, 972 (1936).

N.W. Yunnan.—Doker La on the Tibetan border, on granite and mica-schist, 4050–4600 m.—*Handel-Mazzetti* 9895.

90. *G. stictantha* *Marquand* in *Kew Bull.* 1928, **57**; *Wilkie, Gentians*, 128, fig. 68.

S.E. Tibet.—Doker La, on alpine turf, 4200–4500 m.—*Kingdon Ward* 1134.

Ser. viii. ANNUAE *Marquand*, series nova.
Plantae annuae.

Subser. 1. TETRAMERAE *Marquand* subser. nov.
Calyx 4-lobatus.

91. *G. lineolata* *Franch.* in *Bull. Soc. Bot. France*, **31**, 375 (1884); *Kusnez. Monogr.* 287.

Yunnan.—On open hillsides, 600–3500 m.—*Bodinier in Herb. Léveillé* sine no.; *Cavalerie* 4673, 4674; *Delavay* sine no.; *Ducloux* 505; *Forrest* 11380, 11523, 15192, 17131; *Maire in Herb. Léveillé* sine no.; *Rock* 10880, 11474, 17344, 17346, 18284.

92. *G. praeclara* *Marquand* in *Kew Bull.* 1928, **54**; et in *Journ. Roy. Hort. Soc.* **57**, 202 (1932).

S.W. Szechwan.—Muli mountains, in open alpine meadows, 2400–4200 m.—*Forrest* 17075; *Kingdon Ward* 9868.

Subser. 2. PENTAMERAE *Marquand* subser. nov.
Calyx 5-lobatus.

93. *G. picta* *Franch.* apud *Hemsl.* in *Journ. Linn. Soc., Bot.* **26**, 131 (1890); *Kusnez. Monogr.* 285; *Marquand* in *Journ. Roy. Hort. Soc.* **57**, 203 (1932).

Yunnan.—Heechanmen, above Lankong, 2800 m.—*Delavay* 135; *Ducloux* 646; *Forrest* 354, 413, 13555, 17112; *Rock* 18283; *Schneider* 3695.

94. *G. Blinii* *Lévl.* in *Bull. Géogr. Bot.* **25**, 22 (1915).

Yunnan.—Near Lichiang, in alpine meadows, 4000 m.—*Ducloux in Herb. Bonati* 1432; *Kingdon Ward* 4840; *Maire in Herb. Bonati* 3974, 7403, 7410; *Schneider* 2433.

95. *G. yunnanensis* *Franch.* in *Bull. Soc. Bot. France*, **31**, 376 (1884); *Kusnez. Monogr.* 285.

Kwei-chow, Yunnan and S.E. Tibet.—In alpine meadows, 2500–3500 m.—*Delavay* 136, 1671 ; *Ducloux in Herb. Bonati* 1436, 2742 ; *Forrest* 30, 407, 3019, 3082, 6727, 11187, 11467, 11477, 13243, 15001 ; *McLaren* "N" 222, 224 ; *Maire in Herb. Bonati* 2738, 3973, 7405, 7406, 7407 ; *Maire in Herb. Léveillé* sine no. ; *Rock* 7784, 10710, 10757, 10767, 10821 ; *Schneider* 2627, 2629, 3705, 3780 ; *Tsiang* 9147.

var. **kialensis** *Marquand*, var. nov. ; a typo planta e basi ramosa habitu \pm decumbente, foliis sepalisque angustioribus recedit.

W. SZECHWAN. Sikang : Taofu (Dawo) district ; Taining (Ngata), between Taining and Yara pass, on dampish gravel by a stream, 3700 m., Sept. 3, 1934, *H. Smith* 11734 ; Taining (Ngata), on the gravelly bank of a stream 3700 m., Sept. 9, 1934, *H. Smith* 11999. Between Taining (Ngata) and Maoniui (Ndrömé) ; between Djadjila and the village Tjedji, on a gravelly slope, 3800 m., Sept. 30, 1934, *H. Smith* 12493.

S. E. TIBET. Kiala : Tongolo, *Soulié* 680.

This variety in certain respects approaches *G. tongolensis* and *G. suborbisepala* (Series *Suborbisepalae*), but as pointed out by Dr. Harry Smith (in litt. 11/12/36) its true affinities appear to be with *G. yunnanensis* (Series *Annuae*).

Sect. IV. **APTERA** *Kusnez.* in Act. Hort. Petrop. **13**, 62 (1893); *Marquand* in Journ. Roy. Hort. Soc. **57**, 203 (1932).

96. *G. gracilipes* *Turrill* in Bot. Mag. t. 8630 (1915); *Marquand* in Journ. Roy. Hort. Soc. **57**, 204 (1932) ; *Wilkie*, *Gentians*, **74**, fig. 39.

Kansu.—Tao river basin.—*Rock* 13175, 13719. Cultivated from seed collected by *Purdom*. This species was grown under the manuscript name *Gentiana Purdomii* and was figured under that name, without a technical description, in Gard. Chron. ser. 3, **81**, 143 (Feb. 26, 1927). The reference in the text (p. 144) being merely a description of the habit, does not validate the publication of the name. Hence *G. Purdomi* *Marquand* (1928) stands.

97. *G. dahurica* *Fisch.* in Mém. Soc. Nat. Mosc. **3**, 63 (1812); *Kusnez.* Monogr. **318**; *Wilkie*, *Gentians*, **55**.—*G. Kurroo* var. *brevidens* *Maxim.* ex *Kusnez.* in Bull. Acad. Pétersb. **34**, 508 (1892).

Kansu and N. China.—*Ching* 529, 1090 ; *Licent* 923, 4571, 4573, 4823 ; *Limpricht* 3041 ; *Meyer* 1116 ; *Przewalski* sine no. ; *Purdom* 4955.

98. *G. siphonantha* *Maxim.* ex *Kusnez.* in Mém. Biol. **13**, 176 (1891 vel 1892); et in Bull. Acad. Pétersb. **34**, 506 (1892) ; *Kusnez.* **316**; *Wilkie*, *Gentians*, **126**.

Kansu and N.E. Tibet.—On exposed moist foothills, 2650–3100 m.—*Farrer* 579 ; *Farrer and Purdom* sine no. ; *French Ridley* 38 ; *Przewalski* sine no.

var. **latifolia** *Marquand*, var. nov.; a typo differt foliis latioribus usque ad 2.5 cm. latis, floribus pedunculatis.

Kansu.—Lan-ze-cheou K'ou near Sining.—On exposed moist foothills, 2650–3100 m.—*Ching* 585.

99. *G. macrophylla* Pall. Fl. Ross. **2**, 108 (1788); Kusnez. Monogr. 326; Wilkie, Gentians, 86, fig. 45.—*G. quinquenervia* Turrill in Kew Bull. 1914, 328.

Hopei, Shansi, Kansu and W. Szechwan.—On uplands, 2100–3600 m.—*Bodinier* 39, et sine no. in *Herb. Léveillé*; *Chanet* 919; *Licent* 576; *Purdom* sine no.; *Rock* 13179; *Wilson* 753, 807.

100. *G. Fetisowi* Regel et Winkler in Act. Hort. Petrop. **7**, 548 (1880); et in Gartenfl. **31**, 3, t. 1069, fig. 1–5 (1882); Kusnez. Monogr. 324; Wilkie, Gentians, 64.—*G. Potanini* Maxim. in Herb. Petrop., teste Kusnez. in Act. Hort. Petrop. **15**, 324 (1904).

Kansu and N. Szechwan.—*Potanin* (Herb. Petrop.).

101. *G. pseudodecumbens* H. Sm. in Kew Bull. 1937, 130.

Chihli.—On hills, 1600 m.—*Limpricht* 593; *H. Smith* 1040.

102. *G. biflora* Kusnez. in Act. Hort. Petrop. **13**, 62 (1893); Kusnez. Monogr. 321.

Kansu.—Raised in the Leningrad Botanical Garden from seed collected by Przewalski in the western part of the province. No wild specimens seen.

103. *G. straminea* Maxim. in Bull. Acad. Pétersb. **27**, 502 (1881); et Mém. Biol. **11**, 265; Kusnez. Monogr. 323; Marquand in Journ. Roy. Hort. Soc. **57**, 207 (1932); Wilkie, Gentians, 130, fig. 75.

W. Kansu.—Tangut and Sie kia t'ai.—*Ching* 682; *Fang* 4347, 4383; *Farrer* 612; *Licent* 4572; *Przewalski* sine no.; *Rock* 13715.

104. *G. wutaiensis* Marquand in Kew Bull. 1931, 80.

Shansi.—Wu-tai-shan, on mountain slopes in the alpine region, 1800–3000 m.—*Hancock* (Kew no.) 62; *Ling* 9400; *Tang* 1110.

105. *G. officinalis* H. Sm. in Hand.-Mazz. Symb. Sin. **7**, 979 (1936).

N.W. Szechwan and W. Kansu.—On mountain sides, 3100–3900 m.—*Ching* 753, 807; *H. Smith* 4100, 4135; *Weigold* sine no.

106. *G. dendrologi* Marquand in Kew Bull. 1931, 79.

W. China.—In alpine meadows and grasslands, 3000–3400 m.—*Wilson* (Veitch Exped.) 4125, 4130.

The author is unable to agree with Dr. Harry Smith in reducing this species to *G. straminea* Maxim. The habit of the inflorescence, as well as the much shorter corolla and sessile flowers, seem to justify its separation, though it is certainly allied to that species.

107. *G. crassicaulis* *Duthie ex Burkill* in Journ. Proc. As. Soc. Beng. n.s. **2**, 311 (1906); Marquand in Journ. Roy. Hort. Soc. **57**, 206 (1932); Wilkie, *Gentians*, 53.

Yunnan and W. Szechwan.—Lichiang Range and neighbourhood, in alpine grassland, 2500-3400 m.—*Delavay* 1241 ; *Forrest* 6555 ; *Pratt* 463 ; *Rock* 5901 ; *Soulié* 675 ; *Wilson* 4131.

Sect. VII. **PNEUMONANTHE** (*Neck.*) *Link em. Kusnez.* in Act. Hort. Petrop. **15**, 179 (1898); Marquand in Journ. Roy. Hort. Soc. **57**, 207 (1932).

108. *G. scabra* *Bunge*, Verz. Altai ges. Pfl. **21** (1836); *em. Maxim.* in Mél. Biol. **12**, 759 (1888); Marquand, l.c. 208.—*G. scabra* var. *Burgeana* *Kusnez.* Monogr. 220.

Kiukiang and Hupeh.—*Carles* 131, 147, 491 ; *Wilson* (*Veitch Exped.*) 2666.

var. **Fortunei** (*Hook.*) *Maxim.* in Mél. Biol. **12**, 759 (1888); *Kusnez.* Monogr. 222.—*G. Fortunei* *Hook.* in Bot. Mag. t. 4776 (1854). N. China.—*Fortune* sine no.

Sect. VIII. **ISOMERIA** *Kusnez.* in Act. Hort. Petrop. **15**, 339 (1904); Marquand in Journ. Roy. Hort. Soc. **57**, 208 (1932).

109. *G. Delavayi* *Franch.* in Bull. Soc. Bot. France, **31**, 377 (1884); Marquand, l.c.

Yunnan.—*Bodinier in Herb. Lévillé* sine no. ; *Delavay* sine no. ; *Ducoux* 503 ; *Forrest* 309, 6741, 7372, 11499, 21015 ; *Kingdon Ward* 4993 ; *McLaren* "N" 234 ; *Maire* 1515 ; *Rock* 17343, 17350 ; *Schneider* 2582, 3711.

This species exhibits a considerable range in habit and form of the leaves, but all the forms intergrade and there seems little justification for distinguishing a number of subdivisions such as the forma *caulescens* *Franch.*

Sect. IX. **CHONDROPHYLLA** *Bunge em. Kusnez.* in Act. Hort. Petrop. **15**, 344 (1898); Marquand in Journ. Roy. Hort. Soc. **57**, 210 (1932).

Ser. i. **PUBIGERAE** *Marquand*, series nova.

Caulis, folia, et calyx pubescentia.

110. *G. pubigera* *Marquand* in Kew Bull. 1928, 59.—*G. puberula* *Franch.* apud *Hemsl.* in Journ. Linn. Soc., Bot. **26**, 132 (1890); *Kusnez.* Monogr. 422; non *Michx.* (1803).

Yunnan and S. Szechwan.—In pastures and roadsides, 3000 m.—*Delavay* 2631 ; *Forrest* 2067.

var. **glabrescens** *H. Sm.* in Hand.-Mazz. Symb. Sin. **7**, 961 (1936).

Szechwan.—Sandao-shan between Yen-yuen and Yalung, grassy places, 2400-3300 m.—*Handel-Mazzetti* 2206.

Ser. ii. FIMBRIATAE *Marquand*, series nova.

Plicae fimbriatae.

111. *G. Reynieri* *Lévl.* in Bull. Géogr. Bot. **25**, 22 (1915).—*G. robustior* Burkill ex Diels in Notes Roy. Bot. Gard. Edinb. **7**, 196 (1912), nomen.

W. Hupeh and Yunnan.—Talifu, Tengyueh and Lan-Ngi-Tsin, 2000—3000 m.—*Maire* in *Herb. Lévillé*; *Forrest* 7609; *Schneider* 2689.

112. *G. grata* *H. Sm.* in Anz. Akad. Wiss. Wien, Math.-Nat. **63**, 103 (1926) (Hand.-Mazz. Pl. Nov. Sin., Fortsetz. **40**, 9); et in Hand.-Mazz. Symb. Sin. **7**, 969 (1936).

N.W. Yunnan.—Salwin-Irrawaddi divide, 4050 m.—*Handel-Mazzetti* 9898.

113. *G. burmensis* *Marquand* in Kew Bull. 1928, 49.

N.E. Burma. —Chaw-Chi pass, very local, but abundant in mossy pine slopes in open glades, and on open but sheltered moss-covered cliffs of a ridge of igneous rocks, 2700—3600 m.—*Farrer* 1850; *Kingdon Ward* 1900.

114. *G. formosa* *H. Sm.* in Anz. Akad. Wiss. Wien, Math.-Nat. 1926, **63**, 104 (Hand.-Mazz. Pl. Nov. Sin., Fortsetz. **40**, 10); et in Hand.-Mazz. Symb. Sin. **7**, 970 (1936).

N.W. Yunnan and S.E. Tibet.—Between the Salwin and Irrawaddi and on the Salwin-Kiuchiang divide, in marshy places, 4050 m.—*Forrest* 20272; *Handel-Mazzetti* 9896.

forma **albiflora** *H. Sm.* in Hand.-Mazz. Symb. Sin. **7**, 970 (1936).

Yunnan.—On mountain sides near the boundary of Tibet and Burma, Gomba la near the pass of Tsukue, above 4200 m.—*Handel-Mazzetti* 9874.

115. *G. saltuum* *Marquand* in Kew Bull. 1928, 55.

N.E. Burma.—Moku-je Pass, in damp open grassy places among the cane brakes.—*Farrer* 1795.

116. *G. oligophylla* *H. Sm.* in Kew Bull. 1937, 130.

W. Hupeh.—Fang Hsien.—Uplands, 2100—2400 m.—*Wilson* (Arn. Arb.) 4662.

117. *G. panthaica* *Burkill* in Journ. Proc. As. Soc. Beng. n.s. **2**, 313 (1906).—*G. recurvata* C. B. Clarke sec. Hemsl. in Journ. Linn. Soc., Bot. **26**, 133 (1890), non C. B. Clarke (1883).

Yunnan and Szechwan.—Lichiang, Yen-tze-hay, in meadows.—*Delavay* sine no.; *Forrest* 2349, 5892; *Limpricht* 1057; *Rock* 4686.

118. *G. epichysantha* *Hand.-Mazz.* in Anz. Akad. Wiss. Wien, Math.-Nat. 1920, **57**, 173 (Hand.-Mazz. Pl. Nov. Sin., Fortsetz.

5, 2).—*G. panthaica* var. *epichysantha* (Hand.-Mazz.) H. Sm. in Hand.-Mazz. Symb. Sin. **7**, 966 (1936).

Yunnan and N.E. Upper Burma, 3000–3925 m.—*Forrest* 24703, 24961; *Handel-Mazzetti* 4546.

Ser. iii ORBICULATAE *Marquand*, series nova.

Calycis lobi ovato-lanceolati, recurvati.

119. *G. intricata* *Marquand*, nom. nov.—*G. fastigiata* Franch. in Bull. Soc. Bot. France, **31**, 373 (1884), non Benth. (1844); Kusnez. Monogr. 409.

Yunnan.—Above Schuidsai and Tali, Langkong and Hee-gui-chao.—*Delavay* 21; *Forrest* 109, 15101; *Schneider* 2169.

120. *G. Jamesii* *Hemsl.* in Journ. Linn. Soc., Bot. **26**, 128 (1890); Kusnez. Monogr. 284.

Korea.—*James* sine no.

121. *G. crassuloides* *Bur. et Franch.* in Morot, Journ. de Bot. **5**, 104 (1891); Kusnez. Monogr. 414; *Marquand* in Journ. Roy. Hort. Soc. **57**, 211 (1932).

Shensi and W. Szechwan.—Grasslands, 3000–3600 m.—*Giraldi* sine no.; *Pratt* 250, 603; *Purdom* sine no.; *Wilson* (Veitch Exped.) 4132.

122. *G. pseudosquarrosa* *H. Sm.* in Hand.-Mazz. Symb. Sin. **7**, 963 (1936).

Szechwan and N.W. Yunnan.—In open places, and in meadows, 1800–3500 m.—*Limpricht* 1207; *H. Smith* 2300; *Soulié* 2802; *Wilson* 4133.

123. *G. Crassula* *H. Sm.* in Anz. Akad. Wiss. Wien, Math.-Nat. 1926, **63**, 104 (Hand.-Mazz. Pl. Nov. Sin., Fortsetz. **40**, 10); et in Hand.-Mazz. Symb. Sin. **7**, 963 (1936)—*G. calcicola* *Marquand* ex Wilkie, Gentians, **150**, *nomen*.

S. Szechwan.—In the Muli district and on the Litang-Yalung divide, on limestone cliffs, 3500–4200 m.—*Delavay* 3364; *Handel-Mazzetti* 7171; *Kingdon Ward* 4475.

124. *G. squarrosa* *Ledeb.* in Mém. Acad. Pétersb. **5**, 527 (1812); Kusnez. Monogr. 410.

N. China, from near Peiping to Central Shansi.—On hillsides.—*Bretschneider* 508; *Licent* 940, 1040, 2127; *Przewalski* sine no.; *Schneider* 11.

Ser. iv. LINEARIFOLIAE *Marquand*, series nova.

Folia caulina linearia vel subulata, elongata, angustissima.

125. *G. faucipilosa* *H. Sm.* in Anz. Akad. Wiss. Wien, Math.-Nat. 1926, **63**, 102 (Hand.-Mazz. Pl. Nov. Sin., Fortsetz. **40**, 8); et in Hand.-Mazz. Symb. Sin. **7**, 959 (1936).

Yunnan.—Gumbala, on the Tibetan frontier, Salwin-Irrawaddi divide, 2300–3100 m.—*Handel-Mazzetti* 9872.

var. **caudata** *Marquand*, var. nov., a typo differt corollae lobis caudatis.

Yunnan and Szechwan.—*Cunningham* 265 ; *Forrest* 13865.

Note. This species appears to hybridize or intergrade with *G. scariosa* (no. 128). *Cunningham* 311, collected in Western Szechwan, is an example of an intermediate form.

126. *G. cuneibarba* *H. Sm.* in Anz. Akad. Wiss. Wien, Math.-Nat. 1926, **63**, 102 (*Hand.-Mazz.* Pl. Nov. Sin., Fortsetz. **40**, 8); et in *Hand.-Mazz.* Symb. Sin. **7**, 958 (1936).

N.W. Yunnan.—Near the Salwin, in open grassy localities, 3150 m.—*Handel-Mazzetti* 9610.

127. *G. asterocalyx* *Diels* in Notes Roy. Bot. Gard. Edinb. **5**, 220 (1902).

Yunnan.—Lichiang Range, in woods and mountain pastures.—*Forrest* 2415, 5652, 6131, 22201A ; *Rock* 4929, 10495 ; *Schneider* 2008, 2339.

128. *G. scariosa* *Balf. f. et Forrest* in Notes Roy. Bot. Gard. Edinb. **4**, 74, t. 15 (1907).

Yunnan.—Descent from Niuchang Pass to Chungtien plateau, in open grassy places in pine woods, 3900–4200 m., *Cunningham* 311 ; *Forrest* 404, 15188 ; *Kingdon Ward* 4990 ; *Maire* sine no.

129. *G. aristata* *Maxim.* in Bull. Acad. Pétersb. **26**, 497 (1880); *Mél. Biol.* **10**, 678 ; *Kusnez. Monogr.* 390.

Kansu and N.E. Tibet.—S.W. of Sining, Shang-sin-chuang, 2700 m.—*French Ridley* 12 ; *Learner* sine no.; *Przewalski* sine no.

130. *G. linoides* *Franch. apud Hemsl.* in Journ. Linn. Soc., Bot. **26**, 129 (1890); *Kusnez. Monogr.* 392.

Yunnan.—Koua-la-po, near Hokin.—*Delavay* sine no.

131. *G. choanantha* *Marquand* in Kew Bull. 1931, 85.

W. Szechwan and E. Tibet.—Near Tatsienlu and Kiala, Tongolo, on grassy slopes, 2700–4120 m.—*Pratt* 512 ; *Rock* 17485 ; *Soulié* 877 ; *Wilson* (Veitch Exped.) 4140a.

Ser. v. RUBICUNDAE *Marquand*, series nova.

Flores magni (usque ad 5 cm. longi), carmesini.

132. *G. purpurata* *Maxim.* in Bull. Acad. Pétersb. **34**, 506 (1892); *Kusnez. Monogr.* 392.

W. Szechwan.—East of Sungpan Ting, 2400–2700 m.—*Potanin* sine no.; *Wilson* (Arn. Arb. Exped.) 4703 ; (Veitch Exped.) 4137, 4138a.

133. *G. rubicunda* Franch. in Bull. Soc. Bot. France, **31**, 373 (1884); Kusnez. Monogr. 393.

Yunnan, Hupeh and Szechwan.—*Bodinier* 1343 ; *Delavay* sine no.; *Esquirol* 2076 ; *Henry* 304, 462, 717, 3718, 5234, 5629, 6872, 6872a ; *Potanin* sine no.; *Pratt* 92, 778, 5708 ; *Wilson* (Veitch Exped.) 37.

var. ***delicata*** (*Hance*) *Marquand* stat. nov.—*G. delicata* Hance in Journ. Bot. 1883, 324 ; Kusnez. Monogr. 405.

Fukien, Hupeh and W. Szechwan.—Under bamboos in the first mentioned province, on roadsides, etc., in those further north-west.—*Dunn's collector* 1440 ; *Henry* 233, 5456, 5456b ; *Pratt* 367 ; *Wilson* (Veitch Exped.) 745.

var. ***samolifolia*** (*Franch.*) *Marquand*, stat. nov.—*G. samolifolia* Franch. in Bull. Soc. Bot. France, **43**, 485 (1896).

Hupeh.—Patung district.—*Farges* 948, 1052 ; *Henry* 5456a.

var. ***bellidifolia*** [(*Franch.*)] *Marquand* stat. nov.—*G. bellidifolia* Franch. in Bull. Soc. Bot. France, **43**, 486 (1896), non Hook.f. (1844).

Hupeh, Szechwan and probably Kweichow.—Near "Tchen-kéou-tin".—*Cavalerie* 3587 ; *Farges* sine no.; *Henry* 1438, 3778.

134. *G. Bodinieri* Lévl. in Bull. Géogr. Bot. **24**, 22 (1915).

W. Szechwan.—Iochan and Mount Omei, on rocks, 3200 m.—*Henry* 7123 ; *Pratt* sine no. ; *Wilson* (Veitch Exped.) 5108a.

Ser. vi. HUMILES *Marquand*, series nova.
Flores parvi, caerulei vel albi.

135. *G. subtilis* H. Sm. in Anz. Akad. Wiss. Wien, Math.-Nat. **63**, 103 (1926) (Hand.-Mazz. Pl. Nov. Sin., Fortsetz. **40**, 9); et in Hand.-Mazz. Symb. Sin. **7**, 965 (1936).

N.W. Yunnan.—Mekong-Salwin divide, under Rhododendrons, 3700-4150 m.—*Handel-Mazzetti* 9941.

136. *G. Yokusai* Burkill in Journ. Proc. As. Soc. Beng. n.s. **2**, 316 (1906).—*G. rigidifolia* H. Sm. in Hand.-Mazz. Symb. Sin. **7**, 956 (1936).

Szechwan, Kiangsi, Hupeh and Kwangtung.—Widely distributed as a paddy-field weed at low altitudes.—*Bourne* sine no. ; *Faber* 295 ; *Henry* 506, 765, 7377, 8854 ; *Maingay* 424 ; *Pratt* 388 ; *Shearer* sine no. ; *H. Smith* 7348 ; *Wenyon* sine no. ; *Wilson* (Veitch Exped.) 74.

137. *G. pallescens* H. Sm. (errore typographico "*G. pallida*") in Hand.-Mazz. Symb. Sin. **7**, 962 (1936).

N.W. Yunnan.—Between Huba and Dugwan-tsun, forming mats on the timber line, 4175 m.—*Handel-Mazzetti* 6884.

According to Dr. Harry Smith (in litt. 3/3/1936) *G. pallida* was a typographic error for *G. pallescens*.

138. *G. microphyta* Franch. apud Hemsl. in Journ. Linn. Soc., Bot. **26**, 130 (1890); Kusnez. Monogr. **420**.

Yunnan.—Tsang-shan, above Tali, in woods, 4000 m.—*Delavay* sine no.; *Forrest* 3834, 7074.

139. *G. napulifera* Franch. in Bull. Soc. Bot. France, **43**, 488 (1896).

Yunnan and Fukien.—On grassy mountains and marshy meadows, 1500 m.—*Delavay* sine no.; *Dunn's collector* 3359; *Forrest* 24329; *Handel-Mazzetti* 6369; *Henry* 12098.

140. *G. aperta* Maxim. in Bull. Acad. Pétersb. **27**, 500 (1881); Mél. Biol. **11**, 264; Kusnez. Monogr. **378**.

Kansu.—*Przewalski* sine no.; *Purdom* sine no.

141. *G. Ivanoviczii* Marquand, nom. nov.—*G. Maximowiczii* Kusnez. in Mél. Biol. **13**, 175 (1891 vel 1892); et in Bull. Acad. Pétersb. **34**, 505 (1892); Kusnez. Monogr. **378**; non Kanitz (1891).

W. Kansu and W. Szechwan.—Heaths, 3000-3600 m.—*Farrer* 326; *Potanin* sine no.; *Wilson* (Veitch Exped.) 4140.

The specific epithet, referring to Karl Ivanovicz Maximovicz, maintains Kusnezow's intention of honouring the famous Russian botanist.

142. *G. parvula* H. Sm. in Hand.-Mazz. Symb. Sin. **7**, 961 (1936).

Szechwan.—Ningyüen, Lololand, on sandstone, 3275 m.—*Handel-Mazzetti* 1510.

143. *G. leucomelaena* Maxim. in Bull. Acad. Pétersb. **34**, 505 (1892); Kusnez. Monogr. **376**.

N. Tibet and Kansu.—Near Old Taochow, 3300-3800 m.—*Ching* 821; *Przewalski* sine no.; *Purdom* sine no.; *Pratt* 503.

144. *G. spathulifolia* Maxim. ex Kusnez. in Bull. Acad. Pétersb. **35**, 351 (1894); Kusnez. Monogr. **386**.—*G. aperta* Maxim. in Bull. Acad. Pétersb. **27**, 500 (1881), partim; Mél. Biol. **11**, 264 (1881).

S. Kansu and W. Szechwan.—Sungpan and near Laoshan.—*Farrer* 326; *Licent* 4197; *Potanin* sine no.; *Purdom* sine no.; *Rock* 14606; *Wilson* (Veitch Exped.) 4134.

145. *G. pseudoaquatica* Kusnez. in Act. Hort. Petrop. **13**, 63 (1893); Kusnez. Monogr. **388**.

Shansi.—Peitai and Wu-tai-Shan.—*Potanin* sine no.

146. *G. Grumii* Kusnez. in Act. Hort. Petrop. **13**, 63 (1893); Kusnez. Monogr. **388**.

W. Kansu and N. Tibet borders.—Nan shan Range.—*Grum-Grshimailo* 93.

- 147. *G. heleonastes* H. Sm.** in Kew Bull. 1937, 132.
N.W. Szechwan.—Tsipula, in moist grassy places, about 4000 m.
—*H. Smith* 4192.
- 148. *G. deltoidea* H. Sm.** in Hand.-Mazz. Symb. Sin. 7, 966 (1936).
S. Szechwan.—Pizi, on the Muli Range, on schistose soil, 3500 m.
—*Handel-Mazzetti* 7477.
- 149. *G. Prattii* Kusnez.** in Act. Hort. Petrop. 13, 63 (1893);
Kusnez. Monogr. 387.
W. Szechwan, W. Kansu and Shensi.—Minchow, Tai-pei-shan
and near Ta-tsien-lu.—*Purdum* sine no.; *Pratt* 563; *Rock* 17465.
- 150. *G. incompta* H. Sm.** in Hand.-Mazz. Symb. Sin. 7, 952
(1936).
W. Hupeh and N.E. Szechwan.—Chengko.—*Farges* sine no.
(Herb. Paris); *Wilson* (Veitch Exped.) 2764.
- 151. *G. Licentii* H. Sm.** in Kew Bull. 1937, 132.
N.E. Kansu.—Lashing, near Hoan-kia-ho.—*Licent* 5051.
- 152. *G. praticola* Franch.** in Bull. Soc. Bot. France, 43, 489
(1896)—*G. congestiflora* Marquand ex Wilkie, Gentians, 151, *nomen*.
Yunnan.—Liang-wang-shan.—*Cavalerie* 3059; *Maire* 885.
- 153. *G. aphrosperma* H. Sm.** in Kew Bull. 1937, 133.
N. Szechwan.—Hsioeh-shan, in alpine meadows, 4300 m.—*H.*
Smith 3420.
- 154. *G. radiata* Marquand** in Kew Bull. 1931, 87.
Szechwan.—Muli district, Mount Siga, north-east of Kulu, in
meadows, 4150 m.—*Rock* 17886.
- 155. *G. bella* Franch.** apud Hemsl. in Journ. Linn. Soc., Bot.
26, 124 (1890); Kusnez. Monogr. 423.
Yunnan.—In pastures, Yentze-hay above Lankong, 3200 m.—
Delavay 2033, 2785.
- 156. *G. pubicaulis* H. Sm.** in Hand.-Mazz. Symb. Sin. 7, 970
(1936).
Szechwan.—Sungpan Range.—*Weigold* sine no.
- 157. *G. Piasezkii* Maxim.** in Bull. Acad. Pétersb. 26, 498 (1880);
Kusnez. Monogr. 396.
W. Kansu and N.E. Tibet.—*Farrer* 25, 152; *Potanin* sine no.;
Purdum sine no.

158. *G. inconspicua* H. Sm. in Kew Bull. 1937, 131.

N. Szechwan.—Dongrengo, among *Rhododendron* scrub, 4100–4300 m.—*H. Smith* 3338, 3903.

159. *G. flexicaulis* H. Sm. in Kew Bull. 1937, 133.

N.W. Szechwan.—Sankar-vou-mâ and Matang, 3800–4600 m.—*H. Smith* 4343, 4420.

160. *G. albo-marginata* Marquand, nom. nov.—*G. albescens* Franch. ex Kusnez. in Act. Hort. Petrop. **15**, 409 (1904), non Favre (1875). *G. argentea* Royle var. *albescens* Franch. apud Hemsl. in Journ. Linn. Soc., Bot. **26**, 124 (1890).

Yunnan.—Lankong, on hills, and the Chien Chuan valley, on rocky ground, 2700–3000 m.—*Delavay* sine no.; *Forrest* 406, 2172 ; *Henry* 10903 ; *Maire* 754.

161. *G. stellulata* H. Sm. in Hand.-Mazz. Symb. Sin. **7**, 968 (1936).

N.W. Yunnan.—Between the Salwin and Mekong, in forest and bamboo brakes, 3600–3950 m.—*Handel-Mazzetti* 8360.

var. *dichotoma* H. Sm. l.c. 968.

N.W. Yunnan.—Gomba-la, 3200–3300 m.—*Handel-Mazzetti* 9533.

162. *G. Forrestii* Marquand in Kew Bull. 1928, 52.

N.W. Yunnan.—Mekong–Salwin divide, on open moist stony pastures, 3600–3900 m.—*Forrest* 14183.

163. *G. myrioclada* Franch. in Bull. Soc. Bot. France, **43**, 487 (1896).

W. Szechwan.—Cheng-kou-ting neighbourhood.—*Farges* 289.

164. *G. Mairei* Lévl. in Bull. Géogr. Bot. **24**, 22 (1915).

Yunnan.—Lochan summit, 3400 m.—*Maire* sine no.

165. *G. vandellioides* Hemsl. in Journ. Linn. Soc., Bot. **26**, 137 (1890); Kusnez. Monogr. 394.

Hupeh.—Fang, on rocks at 2000 m. —*Henry* 6738, 6871.

var. *biloba* Franch. in Bull. Soc. Bot. France, **43**, 486 (1896).

Szechwan.—Cheng-kou-ting.—*Farges* 1106, 1243.

166. *G. riparia* Karel. et Kiril. in Bull. Soc. Nat. Mosc. 1841, 706 ; Kusnez. Monogr. 417.—*G. aquatica* Ledeb. Fl. Ross. **3**, 62 (1847).

Kansu, Shansi and N. Tibet.—*Potanin* sine no.; *Przewalski* sine no.; *Rock* 14021.

167. *G. nanobella* Marquand in Kew Bull. 1928, 53.

N.W. Yunnan.—Mekong–Salwin divide, in open moist pasture, 3900 m.—*Forrest* 13220.

168. *G. pudica* Maxim. in Bull. Acad. Pétersb. **26**, 497 (1880).—*G. prostrata* var. *pudica* Kusnez. in Act. Hort. Petrop. **15**, 370 (1904).

Kansu and N.E. Tibet.—North of the River Tetung, and Ko-ko-nor district, on mountain pastures.—*French Ridley* 23; *Licent* 4895; *Przewalski* sine no.

169. *G. Loureirii* Griseb. in DC. Prodr. **9**, 108 (1885); Kusnez. Monogr. 404.

Kwangtung.—Lo-fou-shan and Pei-yung-shan, on terraces in fields at low altitudes.—*Bodinier* 1024; *Hance* 3879; *Ko* 50116; *Sampson* 167; *Tso* 20033.

170. *G. papillosa* Franch. in Bull. Soc. Bot. France, **31**, 394 (1884); Kusnez. Monogr. 405.

Yunnan.—Tapintze, Tali.—*Bodinier* 29, 2153, 2549; *Delavay* 11; *Schoch* 142.

171. *G. alsinoides* Franch. in Bull. Soc. Bot. France, **31**, 374 (1884); Kusnez. Monogr. 415.

Yunnan.—Yang-in-chan, above Lan-kong.—*Delavay* sine no.; *Rock* 4440; *Schneider* 2009 pro parte.

172. *G. maeulchanensis* Franch. in Bull. Soc. Bot. France, **43**, 488 (1896).

Yunnan.—Tali Range and Ma-eul-chan near Hoking, in stony pastures and woods, 2500–3600 m.—*Delavay* 4882; *Forrest* 3822, 9542, 9726.

173. *G. heterostemon* H. Sm. in Hand.-Mazz. Symb. Sin. **7**, 953 (1936).—*G. pedicellata* var. *chinensis* Kusnez. in Act. Hort. Petrop. **15**, 402 (1904).—*G. Monbeigii* Marquand ex Wilkie, Gentians, 160, nomen; *G. ramosa* Marquand ex Wilkie, loc. cit. 164.

Yunnan and W. Szechwan.—Ta-pin-tze, Teng, in open pastures.—*Cunningham* 275; *Delavay* sine no. *Ducloux* 314; *Forrest* 9726; *Maire* 594, 1509, 2726; *Monbeig* sine no.; *Wilson* (Veitch Exped.) 4135, 4136.

var. ***rosulata*** (Kusnez.) Marquand, comb. nov.—*G. pedicellata* var. *rosulata* Kusnez. in Act. Hort. Petrop. **15**, 400 (1904).

Yunnan.—Mengtze, on grassy mountains, 1500 m.—*Henry* 10505.

var. ***Chingii*** Marquand in Kew Bull. 1931, 85.

Anhwei.—Huang shan, under shade, 630 m.—*Ching* 4157.

174. *G. moniliformis* Marquand in Kew Bull. 1931, 86; et in Journ. Roy. Hort. Soc. **57**, 210 (1932).

Yunnan.—Hills east of Tengyueh, 25° N., in marshy pastures, 2100 m.—*Forrest* 7655.

175. *G. chungtienensis* *Marquand* in Kew Bull. 1928, 50.

N.W. Yunnan.—Chungtien plateau, 27° 45' N., in moist open pasture.—*Forrest* 13865.

176. *G. pedata* *H. Sm.* in Hand.-Mazz. Symb. Sin. 7, 967 (1936).

N.E. Yunnan.—Lou pou, Tong tchouan, 2600 m.—*Ducloux* 3187, 4307 (type).

177. *G. macrauchena* *Marquand* in Kew Bull. 1931, 85 (errore typographico "*G. macraucena*").

S.E. Tibet, Tsarong.—Mekong-Salwin divide, Ka-gwr-pu, on boulders and open moist pastures, 3600–3900 m.—*Forrest* 14196.

178. *G. subuniflora* *Marquand* in Kew Bull. 1931, 87.

W. China.—Heaths, 4300–4500 m.—*Wilson* (Veitch Exped.) 4132.

179. *G. Franchetiana* *Kusnez.* in Act. Hort. Petrop. 15, 385

(1904).—*G. pulla* *Franch.* apud *Hemsl.* in Journ. Linn. Soc., Bot. 26, 133 (1890), non *Griseb.* (1874).

Yunnan.—Lankong, on mountains, 2200 m.—*Delavay* 2083 bis ; *Forrest* 22201.

180. *G. exigua* *H. Sm.* in Hand.-Mazz. Symb. Sin. 7, 957 (1936).

Yunnan.—In the neighbourhood of Lichiang and between Yangzi and Gungschan.—*Forrest* 22201 ; *Handel-Mazzetti* 3489 ; *Schneider* 2009 pro parte.

181. *G. anisostemon* *Marquand* in Kew Bull. 1931, 88.

Yunnan.—In alpine meadows on the eastern slopes of the Lichiang snow range, 3600 m.—*Rock* 8339.

182. *G. tatsienensis* *Franch.* in Bull. Soc. Bot. France, 43, 489 (1896).

E. Tibet, Kiala, and W. Kansu.—*Potanin* sine no. ; *Przewalski* sine no. ; *Soulié* 942.

183. *G. taliensis* *Balf f. et Forrest* in Notes Roy. Bot. Gard. Edinb. 4, 75 (1907).

Yunnan.—Around Tali, abundant on grassy slopes, 2000–2400 m.—*Bodinier* 1516 ; *Ducloux* 296 ; *Forrest* 702 ; *Maire* 756 ; *Schneider* 106.

Species imperfecte cognita.

184. *G. sutchuenensis* *Franch.* apud *Hemsl.* in Journ. Linn. Soc., Bot. 26, 136 (1890) ; *Kusnez.* Monogr. 406.

The type of this species has not been found, and its taxonomic position cannot be determined from the very incomplete original description.

INDEX OF ACCEPTED NAMES AND SYNONYMS.

CONVOLVULUS.

trinervis 41.

CRAWFURDIA.

Bulleyana 38; *coerulea* 34; *Delavayi* 24; *fasciculata* 37; *japonica* 41; *japonica* var. *luteo-viridis* 42; *thibetica* 28; *Trailliana* 31; *trinervis* 41.

GENTIANA.

albescens 160; *albo-marginata* 160; *algida* var. *Przewalskii* 85; *alsinoides* 171; *altigena* 69; *altorum* 52; *anisostemon* 181; *aperta* 140; *aperta* 144; *aphrosperma* 153; *apiata* 86; *aquatica* 166; *Arethusae* 51; *argentea* var. *albescens* 160; *aristata* 129; *asterocalyx* 127; *Atkinsonii* 80; *atuntsiensis* 88.

bella 155; *bellidifolia* 133; *biflora* 102; *Blinii* 94; *Bodinieri* 134; *bomareoides* 22; *Bulleyana* 38; *burmensis* 113.

caelestis 52; *callistantha* 63; *caryophyllea* 5; *caudata* 36; *cephalantha* 78; *chinensis* 70; *Chingii* 83; *choanantha* 131; *chungtienensis* 175; *coelestis* 52; *confertifolia* 61; *cordata* 32; *crassicaulis* 107; *Crassula* 123; *crassuloides* 121; *crawfurdioides* 23; *cuneibarba* 126; *curviflora* 26; *cyanea* 34.

dahurica 97; *damyonensis* 3; *Davidi* 79; *decorata* 7; *Delavayi* 109; *delicata* 133; *deltoidea* 148; *dendrologi* 106; *dimidiata* 40; *discoidea* 27; *Duclouxii* 76.

ecaudata 46; *emergens* 68; *epichysantha* 118; *Esquirolii* 77; *eurycolpa* 13; *exigua* 180; *expansa* 20.

Farreri 55; *fascicularis* 37; *fastigiata* 119; *faucipilosa* 125; *Fetisowi* 100; *filicaulis* 11; *filistyla* 66; *flexicaulis* 159; *formosa* 114; *Forrestii* 162; *Fortunei* 108; *Franchetiana* 179; *fratris* 24; *Futtereri* 54.

gentilis 15; *Georgei* 62; *Golowninia* 41; *Golowninia* var. *oblonga* 41; *gracilipes* 96; *grata* 112; *Grumii* 146.

Handeliana 89; *hapalocaula* 19; *Harrowiana* 71; *Heleni* 31; *heleonastes* 147; *helophila* 57; *heptaphylla* 49; *heterostemon* 173; *hexaphylla* 50.

incompta 150; *inconspicua* 158; *intricata* 119; *iochroa* 25; *Ivanoviczii* 141.

Jamesii 120; *Jankae* 9.

khamensis 28; *Kusnezowii* 8; *Kurroo* var. *brevidens* 97.

leptoclada 18; *leucomelaena* 143; *Licentii* 151; *lineolata* 91; *linoides* 130; *Loureirii* 169; *luteo-viridis* 42.

macrauchena 177; *macrophylla* 99; *maulchanensis* 172; *Mairei* 164; *Maximowiczii* 141; *melandriifolia* 75; *membranacea* 33; *microdonta* 74; *microphyta* 138; *moniliformis* 174; *myrioclada* 163.

nanobella 167; *napulifera* 139; *Nienkui* 35.

officinalis 105; *oligophylla* 116; *oreodoxa* 53; *ornata* var. *acutifolia* 52; *otophora* 1; *otophoroides* 2.

pallescens 137 ; *pallida* 137 ; *panthaica* 117 ; *panthaica* var. *epichysantha* 118 ; *papillosa* 170 ; *parvula* 142 ; *pedata* 176 ; *pedicellata* var. *chinensis* 173 ; *pedicellata* var. *rosulata* 173 ; *Phob* 84 ; *phyllocalyx* 65 ; *phyllopoda* 74 ; *Piasezkii* 157 ; *picta* 93 ; *Potanini* 100 ; *praeclara* 92 ; *praticola* 152 ; *Prattii* 149 ; *Pricei* 39 ; *primuliflora* 14 ; *prostrata* var. *pudica* 168 ; *Przewalskii* 85 ; *pseudoaquatica* 145 ; *pseudodecumbens* 101 ; *pseudosquarrosa* 122 ; *pterocalyx* 21 ; *puberula* 110 ; *pubicaulis* 156 ; *pubigera* 110 ; *pudica* 168 ; *pulchra* 16 ; *pulla* 179 ; *Purdomi* 82 ; *purpurata* 132.

quaterna 45 ; *quinquenervia* 99.

radiata 154 ; *recurvata* 117 ; *Reynieri* 111 ; *rhodantha* 9 ; *rigescens* 77 ; *rigidifolia* 136 ; *riparia* 166 ; *robustior* 111 ; *rosularis* 63 ; *rubicunda* 133.

saltuum 115 ; *samolifolia* 133 ; *scabra* 108 ; *scariosa* 128 ; *Schlechteriana* 10 ; *semialata* 29 ; *serra* 17 ; *sessiliflora* 30 ; *sichitoënsis* 4 ; *sikkimensis* 72 ; *sino-ornata* 56 ; *siphonantha* 98 ; *Souliei* 12 ; *spathulifolia* 144 ; *squarrosa* 124 ; *stellulata* 161 ; *stictantha* 90 ; *stragulata* 58 ; *straminea* 103 ; *streptopoda* 73 ; *striata* 10 ; *subocculta* 48 ; *suborbisepala* 60 ; *subtilis* 135 ; *subuniflora* 178 ; *sutchuenensis* 184 ; *Szechenyi* 63.

taliensis 183 ; *tatsienensis* 182 ; *ternifolia* 43 ; *tetraphylla* 44 ; *tizuensis* 64 ; *tongolensis* 59 ; *tricholoba* 10 ; *trichotoma* 84 ; *trinervis* 41 ; *tsarongensis* 6.

vandeliioides 165 ; *Vaniotii* 77 ; *Veitchiorum* 52 ; *viatrix* 47.

Wardii 67 ; *wasenensis* 81 ; *Wiloni* 87 ; *wutaiensis* 104.

Yokusai 136 ; *yunnanensis* 95.

GOLOWNINIA.

japonica 41.

PRINCIPAL LITERATURE.

BALFOUR, I. B.

1918. Some late-flowering Gentians.—Trans. Proc. Bot. Soc. Edinb. 27, 246–272.

BURKILL, I. H.

1906. Gentianacearum species Asiaticas novas (Gentiana).—Journ. As. Soc. Beng. n.s. 2, 309–319.

CLARKE, C. B.

1883. *Crawfurdia* and *Gentiana* (Sect. II–IV).—Hooker, J. D., Flora of British India, 4, 106–108, 110–117.

DIELS, L.

1912. *Plantae Chinenses Forrestianae*: New and imperfectly known species (Gentiana).—Notes Roy. Bot. Gard. Edinb. 5, 220–222.

FORREST, G.

1907. Gentianaceae from Eastern Tibet and South-West China (*Gentiana* and *Crawfurdia*).—Notes Roy. Bot. Gard. Edinb. 4, 69–78.

FRANCHET, A.

1884. Description de quelques espèces de *Gentiana* du Yun-nan.—
Bull. Soc. Bot. France, **31**, 373-378.
1890. *Vide* Hemsley and Franchet.
1896. *Gentiana* nouveaux de la Chine occidentale.—Bull. Soc.
Bot. France, **43**, 485-495.
1899. Les *Swertia* et quelques autres *Gentianées* de la Chine.—
Bull. Soc. Bot. France, **46**, 305-309.

GILG, E.

1895. *Crawfurdia*.—Engl. u. Prantl, Nat. Pflanzenfam. IV.
2. 78-80.

HEMSLEY, W. B. and FRANCHET, A.

1890. *Gentianaceae* (*Crawfurdia* and *Gentiana*) in "Index
Florae Sinensis."—Journ. Linn. Soc., Bot. **26**, 122-138.

KUSNEZOW, N. I.

1895. *Gentiana*, Untergattung *Eugentiana*.—Engler u. Prantl,
Nat. Pflanzenfam. IV. 2. 80-85.
1896-1904.
Subgenus *Eugentiana* Kusnez. generis *Gentiana* Tournef.
—Act. Hort. Petrop. **15**, 1-507.

MARQUAND, C. V. B.

1928. New Asiatic *Gentians*.—Kew Bull. 1928, 49-62.
1931. New Asiatic *Gentians*: II.—Kew Bull. 1931, 68-88.
1932. The cultivated *Gentians* of China and the Himalaya.—
Journ. Roy. Hort. Soc. **57**, 188-211.

MAXIMOWICZ, C. J.

1880. Diagnoses plantarum novarum asiaticarum: III.—
Mélanges Biologiques, **10**, 677-679.
1892. Diagnoses plantarum novarum asiaticarum: VIII. (pp.
28-36).

SMITH, H.

1926. *Gentiana* in Handel-Mazzetti, Plantae novae Sinenses,
Forsetz. **40**, 4-11.—Anz. Akad. Wiss. Wien, Math.-Nat.
63, 98-105.
1936. *Gentiana*.—Hand.-Mazz. Symb. Sin. **7**, 950-979.

SMITH, W. W.

1913. Diagnoses specierum novarum chinensium (*Gentiana*).—
Notes Roy. Bot. Gard. Edin. **8**, 121, 122.

WILKIE, D.

1936. *Gentians*. London, Country Life Limited. 8vo. pp. 187,
figs. 91 and frontispiece.

**XXI—CONTRIBUTIONS TO THE GENTIAN FLORA
OF SOUTHERN TIBET, N.E. BURMA AND BHUTAN.**
C. V. B. MARQUAND.

The following Enumeration comprises the *gentians* of recent collections made by Captain F. Kingdon Ward, and of others made by Messrs. F. Ludlow and G. Sheriff, and by Mr. K. N. Sharma, all

received on loan for study from the Department of Botany, British Museum. It includes also records of specimens sent to Kew by Captain Kingdon Ward from two earlier expeditions to the Burma-Tibet frontier. Five species are described here for the first time.

Sect. **OTOPHORA** *Kusnez.* : supra p. 152.

G. damyonensis *Marquand* in Kew Bull. 1928, 51.

BURMA-TIBET FRONTIER. Flowers pale cream, speckled violet ; forms large carpet-like colonies bearing dozens of erect flowering shoots, on the high alpine rocks and gravelly slopes, 28° 25' N., 97° 55' E., 3900–4200 m., Nov. 23, 1931, *Kingdon Ward* 10099.

G. decorata *Diels* in Notes Roy. Bot. Gard. Edinb. 5, 220 (1912).

S.E. TIBET. Flowers violet ; alpine turf slopes, Zo La, between Shugden and Sangachu Dzong, 4500–4800 m., Sept. 7, 1933, *Kingdon Ward* 10875.

G. infelix *C. B. Clarke* in Hook. f. Fl. Brit. Ind. 4, 111 (1883).

NEPAL. Meechal, 4700 m., Aug. 25, 1932, *Sharma* 377.

G. microtophora *Marquand*, sp. nov. (Sect. *Otophora*) ; in sectione plicis vix auriculatis distinctissima ; facie et habitu *G. infelicis* *C. B. Clarke* a qua calycis lobis subacutis, statu humiliore, floribus multo minoribus differt ; a *G. minuta* *N. E. Brown* calycis lobis haud recurvatis, corolla duplo majoribus recedit.

Perennial with a rather slender caudex giving rise to a single root, simple or branched at the base. *Stems* one to numerous, decumbent, unbranched, 1–1.5 cm. long, the fertile ones with a single terminal flower. Base of stem bearing several short, triangular, acute hypophylls, united in pairs into conspicuous leaf sheaths. No *basal rosette leaves* present. *Cauline leaves* ovate-lanceolate, subacute, 3 mm. long, 1.5 mm. wide, without a conspicuous hyaline margin. *Flowers* solitary, terminal, shortly pedicellate (pedicels 1–2 mm. long). *Calyx* campanulate : tube 1.5–2 mm. long, 2 mm. in diameter ; lobes 5, equal, ovate, narrowed at the base, subacute, 2 mm. long, 1.25–1.5 mm. wide, sinus acute. *Corolla* tubular-campanulate : tube 4–4.5 mm. long, 2 mm. in diameter ; lobes 5, lanceolate-ovate, subobtus, 2.5 mm. long, 1.5 mm. wide, veins rather conspicuous in dried specimens ; plicae minute, triangular, scarcely $\frac{1}{4}$ the height of the lobes. *Stamens* five, 4–5 mm. long : anthers subglobose ; filaments filiform. *Ovary* subsessile, 4.5 mm. long, 0.75 mm. in diameter ; style very short. *Mature seeds* not seen.

BURMA-TIBET FRONTIER. Sources of the Irrawaddy, Adung valley, 28° 20' N., 97° 40' E., 4200–4500 m., Aug. 8, 1931, *Kingdon Ward* 9921 (type in Brit. Mus.).

This species is placed in Sect. *Otophora* on account of its obvious affinities with *Gentiana infelix* and *G. tsarongensis* ; the plicae, however, are not typical for the Section *Otophora* but show a

transition to the Section *Chondrophylla*. It is the only aberrant species of the otherwise extremely well marked Section *Otophora*.

Gentiana otophora Franch. var. **ovatisepala** Marquand, var. nov. ; a typo floribus minoribus, calycis lobis ovatis acutis inter se inaequalibus multo majoribus ad 5 mm. longis 2.5 mm. latis basi constrictis, tubo usque ad 6 mm. longo differt.

BURMA-TIBET FRONTIER. Sources of the Irrawaddy, Adung valley, 28° 20' N., 97° 40' E., 3900–4200 m., Sept. 12, 1921, *Kingdon Ward* 9927 (type in Brit. Mus.).

The collector describes this plant as follows : “Flowers pale yellow, speckled violet. Scattered over steep alpine turf and flower-clad slopes. The stems are more or less prostrate and ascending, the flowers standing erect.” The calyx-lobes are unequal in size, unlike those of typical *G. otophora*, but they exhibit a considerable range of variation, the largest being sometimes distinctly foliaceous.

G. tsarongensis Balf. f. et Forrest ex Marquand in Kew Bull. 1928, 62.

TIBET. Flowers glossy violet ; growing all over the bare alpine turf slopes and rock outcrops, abundant and commonest alpine autumn flower, 28° 25' N., 97° 55' E., *Kingdon Ward* 10108.

BURMA-TIBET FRONTIER. Flowers violet with yellow anthers, having rather the shape and appearance of a *Crocus* ; forms mats on the smooth glaciated granite rocks in the high Alps, 28° 25' N., 97° 55' E., 4200 m., Nov. 22, 1936, *Kingdon Ward* 10096.

Sect. **DIPTEROSPERMUM** Marquand ; supra p. 155.

G. bomareoides Marquand in Kew Bull. 1931, 73.

BURMA-TIBET FRONTIER. Flowers violet, alternating in bands lighter and darker ; a common twiner in open thickets where *Arundinaria* grows, 28° 25' N., 97° 55' E., 1800 m., Nov. 4, 1931, *Kingdon Ward* 10146.

G. Heleni Marquand in Kew Bull. 1931, 69.

BURMA-TIBET FRONTIER. Flowers almost white, faintly and delicately flushed pinky purple ; open places, thickets facing south, hills east of the Nam Tisang, 28° 20' N., 97° 40' E., 1200 m., Jan. 5, 1931, *Kingdon Ward* 9092 ; without field data, *Kingdon Ward* 10184.

S.E. TIBET. Flowers purple ; a twiner in thickets and damp shady valleys, Rong Tö valley, near Rima, Zayul, 1500 m., Dec. 3, 1933, *Kingdon Ward* 10999.

G. Kingdonii Marquand in Kew Bull. 1931, 70.

S.E. TIBET. Flowers violet, nearly over ; on the edge of mixed forest, Modung, Rong Tö valley, Zayul, 2400–2700 m., Oct. 25, 1933, *Kingdon Ward* 10917. Flowers violet ; a twining plant in the forest, Putsang river, Rong Tö valley, 2400 m., Nov. 2, 1933, *Kingdon Ward* 10948.

G. atuntsiensis *W. W. Sm.* in Notes Roy. Bot. Gard. Edinb. **7**, 121 (1913).

S.E. TIBET. Flowers a gorgeous sea blue; an erect glabrous plant, scattered on the dry turfy slopes where shrubs (*Rhododendron*, *Salix*, etc.) grow, Shiuden Gomba, Nagong, 4200–4500 m., Aug. 18, 1933, *Kingdon Ward* 10766.

G. filistyla *Balf. f. et Forrest ex Marquand* var. **parviflora** *Marquand*, var. nov.; a typo floribus multo minoribus vix usque ad 1.5 cm. longis differt.

BURMA-TIBET FRONTIER. Flowers trumpet or narrow funnel shaped, more or less erect or prostrate, sessile or nearly so, brilliant ultramarine; it forms small carpeting colonies on the steep alpine turf slopes; just coming into flower, not common (collected in the Seinghku valley in 1926); leaves fleshy, closely imbricated, glabrous; calyx green, glabrous; sources of the Irrawaddy, Adung valley, 28° 20' N., 97° 40' E., 4200 m., *Kingdon Ward* 9865 (type in Brit. Mus.). Fruit of same: "Seeds ripe in the first fortnight of October," 4200 m., Oct. 16, 1931, *Kingdon Ward* 10122. Flowers violet; in clumps on alpine turf and rock slopes, Diphuk La, 4200 m., July 29, 1926, *Kingdon Ward* 7222. Valley of the Seinghku, 28° 10' N., 97° 20' E., 4200 m., Oct. 14, 1926, *Kingdon Ward* (with no. 7592).

This is a particularly interesting plant in that it connects the Himalayan *G. tubiflora* with the Chinese *G. filistyla* through the var. *namlaënsis* *Marquand* of the former species. The flowers are the size of the former, from which the present plant is distinct in the leaves being rounded at the apex, in which character it agrees with the type of *Gentiana filistyla*.

G. gilvo-striata *Marquand* in Kew Bull. 1931, 83.

TIBET. Flowers a lovely blue, fine speckled inside; on an earth slide, amongst tall herbage in the open river bed, Putsang river, Rong Tö valley, Zayul, 3000 m., Nov. 5, 1933, *Kingdon Ward* 10955. Sources of the Irrawaddy, 28° 20' N., 97° 40' E., *Kingdon Ward* 10000.

G. gilvo-striata *Marquand* var. **stricta** *Marquand* var. nov.; a typo calycis lobis ovatis subacutis, foliis angustioribus differt.

Perennial, subprostrate with numerous barren stems and 1–3 fertile stems arising from a rather slender caudex. *Stems* all naked at the base, terminated by a rosette of leaves with a few smaller leaves below. *Leaves* elliptic to spatulate or oblanceolate, subobtusate, margin scaberulous, those on the barren stems up to 9 mm. long, 1.5 mm. wide, those on the fertile stems somewhat larger. *Calyx-tube* tubular, up to 1 cm. long, 5 mm. in diameter at the mouth, coloured dark purple on one side; lobes broadly ovate, up to 3 mm. long, 2 mm. wide, constricted at the base. *Corolla* infundibular;

tube very slightly expanded above the calyx, rich blue; lobes 5, broadly ovate, shortly acuminate; plicae subtruncate, 2–3 mm. wide. *Stamens* united to just above middle of filaments, free portion 1 cm. long; anthers 2 mm. long, ellipsoid, slightly attenuate at the apex. *Ovary* stipitate, linear-lanceolate; style long.

TIBET-BURMA FRONTIER. On alpine grass slopes and cliffs in clumps, flowers rich blue, Delei valley, 28° 15' N., 96° 35' E., 3400–3600 m., Oct. 25, 1928, *Kingdon Ward* 9715 (type in Kew Herb.).

G. Handeliana *H. Sm.* in Anz. Akad. Wiss. Wien, Math.-Nat. **63**, 98 (1926).

BURMA-TIBET FRONTIER. Corolla cream inside, green, speckled dull violet outside; flowers in compact heads; whole plant glabrous; forms clumps in open turfy patches amongst dwarf *Juniperus*, *Rhododendron*, etc., in the Fir forest; sources of the Irrawaddy, Adung valley, 3600 m., *Kingdon Ward* 9970.

G. Handeliana *H. Sm.* var. **brevisepala** *Marquand* in Kew Bull. 1931, 84.

UPPER BURMA. Flowers dark blue; on alpine turf slopes in the valley of the Seinghku, near the Tibetan frontier, 28° 90' N., 97° 20' E., 3600 m., Oct. 5, 1936, *Kingdon Ward* 7541.

G. lhakangensis *Marquand*, sp. nov.; affinis *G. decumbenti* L. et *G. stramineae* Maxim., a priore floribus albis, a posteriore calyce truncato, ab utroque floribus dense aggregatis differt.

Perennial. *Caudex* not seen. *Stems* decumbent, rather thick, terete, glabrous, 20–25 cm. long, with 3–4 pairs of leaves. *Basal leaves* narrowly lanceolate, acute, attenuate into the leaf sheath, 15–22 cm. long, 2–5 cm. wide (fibrous leaf bases not seen); midrib broad, lateral nerves slender. *Cauline leaves* lanceolate or recurved, acute, up to 6 cm. long, 8–9 mm. wide, apex subacute. *Flowers* densely-aggregated in a pseudo-capitate terminal inflorescence with a few arising on short peduncles from the nodes below. *Bracts* leaflike but smaller. *Calyx* truncate, dimidiate-spathaceous, membranous, 6–7 mm. long, 4–5 mm. wide, lobes 0 or reduced to minute denticulations. *Corolla* tubular-infundibular, greenish white: tube 2.2–2.6 cm. long, 8–9 mm. in diameter at the mouth; lobes ovate, subacute, 4–5 mm. long, 3–4 mm. wide; plicae triangular, acute, scarcely half the length of the lobes. *Stamens* 5: filaments slender, filiform, not winged, 2 cm. long, upper 1.2 cm. free from the corolla; anthers narrow-oblong, 2 mm. long. *Ovary* shortly stipitate, 1.5 cm. long, 1.5 mm. wide, gradually attenuated into a short bifid style (about 1 mm. long); stigmata recurved. *Mature seed* not seen.

S. TIBET. Lhakang, on open grassy hillside, 3900 m., Sept. 1, 1933, *Ludlow & Sheriff* 515 (type in Brit. Mus.).

G. lhassica *Burkill* in Journ. As. Soc. Beng. n.s. **2**, 311 (1906).

S.E. TIBET. Flower deep cornflower blue; on open grassy hill-

sides, stony soil, Dza La, 4800 m., Aug. 10, 1934, *Ludlow & Sheriff* 788.

G. oreodoxa *H. Sm.* in *Anz. Akad. Wiss. Wien, Math.-Nat.* **63**, 99 (1926).

TIBET. In flower on the steep rocky side of a dry gully, in full sun, 3000–3400 m., Nov. 28, 1933; in fruit on the screes at the base, 3600 m., Rong Tö, Dibang divide, Zayul, *Kingdon Ward* 10860.

G. phyllocalyx *C. B. Clarke* in *Hook. f. Fl. Brit. Ind.* **4**, 116 (1883).

N. BURMA. Flowers blue; on alpine turf slopes facing north, Kaso, Delei valley, 28° 21' N., 96° 37' E., 3600–3900 m., July 2, 1928, *Kingdon Ward* 8410.

BURMA-TIBET FRONTIER. Flowers Prussian blue outside, ultramarine within, anthers and stigmas white; a glabrous plant growing scattered amongst dwarf *Rhododendron*, on precipitous turf slopes; sometimes forms considerable colonies and grows 6 inches high, now in good bloom, pollinated by flies, 3900–4200 m., July 22, 1931, *Kingdon Ward* 9847. Flowers pale blue; forms small clumps on alpine turf slopes; very like 9847 and often associated with it, but an altogether smaller plant with paler coloured flowers; the scape does not lengthen out as it does in 9847 and the anthers are much smaller; sources of the Irrawaddy, Adung valley, 28° 20' N., 97° 40' E., *Kingdon Ward* 9980.

TIBET. In fruit; the flowers are usually solitary, but sometimes an extra one is borne in one of the lower leaf axils; 28° 25' N., 97° 55' E., *Kingdon Ward* 10113.

G. prolata *Balf. f.* in *Trans. Proc. Bot. Soc. Edinb.* **27**, 266 (1918).

N. E. BHUTAN. Open stony ground above the tree line, Me La, 4200 m., Oct. 5, 1934, *Ludlow & Sheriff* 1024.

G. setulifolia *Marquand* in *Kew Bull.* 1928, 56.

BURMA-TIBET FRONTIER. Valley of the Seinghku, on granite slabs in shelter under cliffs, but in the open, 3000 m., *Kingdon Ward* 7485. Valley of the Seinghku, 28° 10' N., 97° 20' E., 3600–3900 m., Oct. 13, 1926, *Kingdon Ward* (with no. 7585).

This extremely interesting species has not been found elsewhere.

G. sikkimensis *C. B. Clarke* in *Hook. f. Fl. Brit. Ind.* **4**, 144 (1883).

TIBET. Flowers pale blue; a glabrous plant growing in small colonies under bushes or on grassy banks, 28° 25' N., 97° 55' E., *Kingdon Ward* 10004. Flowers washy blue; under *Rhododendron* bushes and on grassy alpine slopes, Chutong Camp, Ata Kang La, Zayul, 3900 m., Oct. 20, 1933, *Kingdon Ward* 10910.

G. sino-ornata *Balf. f.* in *Trans. Proc. Bot. Soc. Edinb.* **27**, 253 (1918).

TIBET. 28° 25' N., 97° 55' E., Sept. 19, 1931 (growing with *G. Veitchiorum* var. *caelestis* Marquand), *Kingdon Ward* 10101.

Shiuden Gomba, Nagong, 4200–4500 m., Sept. 3, 1933, forms of this species growing with a form of *G. Veitchiorum* Hemsl., *Kingdon Ward* 10807.

G. sino-ornata Balf. f. var. **punctata** Marquand in Kew Bull. 1931, 84.

BURMA-TIBET FRONTIER. Corolla sea-blue at the mouth, fading through paler blue to almost white at the base, where it is striped and dotted blue; on open patches of gritty loam (granite) between clumps of dwarf *Rhododendron* on sunny slopes in the valley of the Seinghku, 28° 10' N., 97° 20' E., 3600 m., Oct. 13, 1926, *Kingdon Ward* 7586.

G. stictantha Marquand in Kew Bull. 1928, 57.

BURMA-TIBET FRONTIER. Flowers pale yellow, spotted and streaked with violet on the outside; growing in clumps on ledges of grassland escarpments, valley of the Seinghku, 28° 10' N., 97° 20' E., 3600–3900 m., Oct. 4, 1926, *Kingdon Ward* 7530.

G. streptopoda Balf. f. et Forrest ex Marquand in Kew Bull. 1928, 61.

BURMA-TIBET FRONTIER. In colonies on grass slopes and ledges of cliffs, valley of the Seinghku, 28° 10' N., 97° 20' E., 3900 m., Oct. 4, 1926, *Kingdon Ward* 7533. Flowers deep blue (?), closed at the time of collecting, in small close heads; sources of the Irrawaddy, Adung valley, 28° 20' N., 97° 40' E., on steep scrub-clad slopes on the sheltered side of a lofty ridge, 4200 m., Nov. 27, 1931, *Kingdon Ward* 9993. Flowers some shade of blue (closed); on alpine turf slopes, on sheltered flank, 4200 m., Oct. 12, 1931, *Kingdon Ward* 10117.

G. Szechenyi Kanitz, Pl. exped. Szechenyi in As. Centr. coll. 40 (1891).

TIBET. A glabrous plant with mauve flowers; scattered over the dry slopes, Shiuden Gomba, Nagong, 4200–4500 m., Aug. 18, 1933, *Kingdon Ward* 10765. Plants in ripe fruit, shedding their seeds, and other plants in good bloom, growing with *G. sino-ornata*, in ripe fruit, Shinden Gompa, Nagong, 4200 m., Oct. 9, 1933, *Kingdon Ward* 10898.

G. tubiflora Wall. var. **namlaënsis** Marquand in Journ. Linn. Soc., Bot. 48, 206 (1929).

TIBET. Zayul, on steep sheltered alpine slopes with *G. phyllo-calyx* and dwarf *Rhododendron*, 4200 m., Oct. 20, 1933, *Kingdon Ward* 10903.

G. Veitchiorum Hemsl. in Gard. Chron. 46, 178 (1909).

TIBET. Damp pastures, 3900–4200 m., July 31, 1933, *Kingdon Ward* 10666. Shiuden Gomba: Nagong, 4200–4500 m., Sept. 3, 1933, a form of this species growing with forms of *G. sino-ornata*, represented under the same number, *Kingdon Ward* 10807. The following notes were made by the collector.—Colour varieties of *G.*

sino-ornata with Cambridge blue, white or violet flowers. White forms are scattered amongst the deep blue; also a few light blue. In damper ground there was a big patch of Cambridge blue only.

var. *caelestis* Marquand in Kew Bull. 1931, 84.

TIBET. 28° 25' N., 97° 55' E., *Kingdon Ward* 10101.

This grew mixed with a form of *G. sino-ornata* Balf. f., both plants being represented under the same number. The following notes apparently cover both. "A beautiful species allied to *G. ornata* or *G. Veitchiorum*. The flowers vary from almost Cambridge blue to Oxford blue, the pleats dark on the outside, pale and spotted inside, the mouth of the trumpet sheer blue. It forms large turfy carpets bearing great numbers of more or less prone flowers which open irrespective of the weather. Grows on alpine rocks and slopes in open turfy pastures and even in boggy places. Very abundant."

G. Wardii W. W. Sm. in Notes Roy. Bot. Gard. Edin. 7, 122 (1913).

TIBET. Flowers pure slaty violet; a tiny alpine forming compact little colonies on the grassy slabs and gravel patches of the iceworn rocks; sources of the Irrawaddy, 28° 20' N., 97° 40' E., 3900–4200 m., *Kingdon Ward* 9998. Flowers deep sea blue; forms mats on sandy and gravelly slopes, by streams near the limit of flowering plants, Zo La between Shugden and Sangachu Dzong, 4500–4800 m., Sept. 7, 1933, *Kingdon Ward* 10826. In ripe fruit, alpine turf, Chutong Camp, below the Ata Kang La, Zayul, 4200 m., Oct. 20, 1933, *Kingdon Ward* 10902.

G. Wardii W. W. Sm. var. *micrantha* Marquand, var. nov.; a typo floribus minoribus, corolla vix 1 cm. longa 5–6 mm. diametro fauce leviter contracta, foliis parvis obovato-spathulatis ad 7 mm. longis 3–5 mm. latis differt.

S. E. TIBET. Sources of the Irrawaddy, Adung valley, 4400–4500 m., 28° 20' N., 97° 40' E., Aug. 20, 1931, *Kingdon Ward* 9979. Also at 28° 25' N., 97° 55' E., 4200 m., Sept. 1, 1931, *Kingdon Ward* 10010 (type in Brit. Mus.); *ibid.*, seeds ripe, Oct. 16, 1931, *Kingdon Ward* 10123.

Captain Kingdon Ward made the following notes on no. 9979 in the field.—Corolla pale blue within and without. Flowers almost sessile, bulb-like, appearing in small groups of 1 to 6 almost straight out of the ground. It grows scattered on the topmost ridges on gravelly or sandy patches amongst the rocks; sometimes in the carpet of dwarf willow associated with several other Gentians, particularly nos. 9865 [*G. filistyla* var. *parviflora*], 9921 [*G. microtophora*] and 9980 [*G. phyllocalyx*].

On no. 10010 Captain Kingdon Ward writes: "Flowers ultramarine fading to white at the base. Forms small carpet colonies bearing a dozen or so flowers like fat buttons."

G. yunnanensis Franch. in Bull. Soc. Bot. France, 31, 376 (1884).

BURMA-TIBET FRONTIER. Flowers pallid blue, rather dull and

slaty ; in open places in the forest, 28° 25' N., 97° 55' E., 3400 m., Nov. 6, 1931, *Kingdon Ward* 10044.

Sect. **APTERA** *Kusnez.* ; supra p. 166.

G. straminea *Maxim.* in Bull. Acad. Pétersb. **27**, 502 (1881).

S. TIBET. Flowers cream, unspckled ; a rosette plant with long radiating ascending stems ; leaves fleshy ; on stony ground, open places, Shiuden Gomba, Nagong, 3900–4200 m., July 28, 1933, *Kingdon Ward* 10658.

G. Waltonii *Burkill* in Journ. As. Soc. Beng. n. s. **2**, 310 (1906).

S. TIBET. Flower lemon yellow, slaty streaks down outside of petals ; among stones, only one seen ; Pomo Tso, 4800 m., Sept. 11, 1933, *Ludlow & Sherriff* 526. Flower deep blue ; rocky hillside, Gyantze, 4200 m., Sept. 15, 1933, *Ludlow & Sherriff* 529.

Sect. **CHONDROPHYLLA** *Bunge* em. *Kusnez.* ; supra p. 168

G. bryoides *Burkill* in Journ. As. Soc. Beng. n.s. **2**, 316 (1906).

S. E. TIBET. Flower bright cornflower blue ; open grassy hillside, Mago, 4200 m., Aug. 3, 1934, *Ludlow & Sherriff* 756.

G. burmensis *Marquand* in Kew Bull. 1928, 49.

S. E. TIBET. Flowers violet with white hairs in the throat ; abundant on sunny alpine slopes, amongst rocks, and on gravel slides, forms clumps [mixed with a species of *Gentianella*] ; 3900–4200 m., 28° 25' N., 97° 55' E., *Kingdon Ward* 10105.

G. capitata *Buch.-Ham. ex G. Don*, Prodr. Fl. Nep. 126 (1825).

ASSAM. Flowers pale blue ; in pine forest, open sunny paths and grassy slopes, abundant, 1500–1800 m., March 1, 1933, *Kingdon Ward* 10301.

G. crassuloides *Bur. et Franch.* in Morot, Journ. de Bot. **5**, 103 (1891).

S. E. TIBET. Flower purple azure ; stony damp ground, Mago, 4500 m., Aug. 5, 1934, *Ludlow & Sherriff* 769.

G. grata *H. Sm.* in Anz. Akad. Wiss. Wien, Math.-Nat. **63**, 103 (1926).

BURMA-TIBET FRONTIER. Flowers nodding, very pale blue with dark violet spots towards the base, mostly over, only one flower ; not abundant, growing on a steep earth slope, 3600–3900 m., Sept. 27, 1926, *Kingdon Ward* 7492.

G. formosa *H. Sm.* in Anz. Akad. Wiss. Wien, Math.-Nat. **63**, 104 (1926).

TIBET. A slender entirely glabrous plant scattered on the open steep turfed slopes at the foot of the granite cliffs ; corolla bluish violet, darker at the base, spotted darker within, the rim fringed ; stamens 5 with purple anthers ; flowers are nodding and remain closed in the rain ; sources of the Irrawaddy, 28° 20' N., 97° 40' E.,

3900–4200 m., July 31, 1931, *Kingdon Ward* 9887. Flowers more violet than no. 9887; scattered over the rock slopes on alpine turf, 3900–4200 m., Sept. 27, 1931, *Kingdon Ward* 9995.

G. leucomelaena Maxim. in Bull. Acad. Pétersb. **34**, 505 (1892).

LADAK. Flowers white with sepals pale blue; grassy banks of streams, Shushal, 4300 m., Aug. 4, 1936, *Ludlow* 836.

G. Ludlowi Marquand, sp. nov.; affinis *G. pudicae* Maxim., a qua calycis tubo fere duplo longiore pedicellis brevioribus differt.

Annual. Root slender. Stem branched near the base, each branch bearing a single terminal flower. Branches up to 6 cm. long, green or purplish-brown, angular, asperous or rugose. Basal leaves 0 or few. Cauline leaves ovate, acute, 6–7 mm. long, 3–3.5 mm. wide, with a narrow cartilaginous margin. Pedicels 1–2 mm. long, glabrous. Calyx tubular, up to 2 cm. long, 3–3.5 mm. in diameter; lobes triangular, acute, 3.5 mm. long, 1.5 mm. wide at the base, with a scarious margin, narrow at apex, widening downwards to a rather wide sinus. Corolla blue; tube 2 cm. long; lobes lanceolate, subacute, 5 mm. long, 2–2.5 mm. wide, suffused with green on exterior; plicae more or less triangular, erose or indistinctly three-lobed, $\frac{1}{2}$ – $\frac{2}{3}$ the length of the lobes. Stamens 1.5 cm. long; filaments narrowly winged above, with a single rather wide wing below, united to the corolla-tube for a distance of 12–14 mm.; anthers 2.5 mm. long. Ovary shortly stipitate, linear-ellipsoid, attenuate at the apex; style short; gynophore rather stout. Immature seeds not winged. Mature seed not seen.

S. TIBET. Shady rocky hillside, Lhakang, 3900 m., Sept. 1, 1933, *Ludlow & Sherriff* 507 (type in Brit. Mus.).

This appears to be a rather distinct species allied to *Gentiana pudica* Maxim., a plant from north-west China and north-east Tibet which was referred to *G. prostrata* Haenke, as a variety, by Kusnezow in his monograph on *Eugentiana*. The specific concept taken by that author in this instance is extremely wide, embracing varieties from North and South America as well as throughout Asia.

G. micantiformis Burkill in Journ. As. Soc. Beng. n.s. **2**, 315 (1906).

BHUTAN. Flowers pale blue; grassy hill slopes, Yatung, 3000 m., May 18, 1934, *Ludlow & Sherriff* 13a.

Gentiana muscicola Marquand, sp. nov.; affinis *G. vandelliioides* Hemsl., a qua corollae plicis laciniatis, calycis lobis triangularibus, sinibus angustioribus, pedicellis multo brevioribus insigniter differt.

Perennial? Stems slender, simple or once or twice branched, up to 5 cm. long, glabrous, with slender roots growing in moss. Basal rosette leaves none. Cauline leaves widespreading, membranous, broadly ovate, apiculate, 4 mm. long, 3 mm. wide, midrib rather conspicuous in the dried state; petioles very short.

Flowers solitary, terminal on the branches ; pedicels erect, 3 mm. long. *Calyx* tubular : tube 2-2.5 mm. long, 1.25 mm. in diameter ; lobes 5, triangular, acute, erect or slightly spreading at the apex. *Corolla* infundibular, pale violet : tube 5 mm. long ; lobes 5, wide-spreading, ovate-lanceolate or narrowly ovate, subacute, 3 mm. long, 1.25 mm. wide ; plicae triangular-ovate, lacinate, much shorter than the lobes, whitish. *Stamens* 5 : filaments slender, upper 2.5 mm. free ; anthers narrow, oblong, 0.75 mm. long. *Ovary* shortly stipitate, ellipsoid, 3 mm. long, 1.25 mm. wide, rapidly attenuate into the long style ; style 2 mm. in length ; stigmata recurved.

BURMA-TIBET FRONTIER. Flowers faintly violet, shutting up immediately they are extracted from the moss beds in which they grow in the *Tsuga-Rhododendron* forest ; Delei valley, 28° 21' N., 96° 37' E., 2700-3000 m., July 6, 1928, *Kingdon Ward* 8393.

This rather distinct species is remarkable in its habit of growth, the stems struggling through the moss.

G. pedicellata Griseb. Gen. et Sp. Gentian. 273 (1839).

NEPAL. Flowers blue, with seeds ; Siroo, 2600 m., April 28, 1933, *Sharma* E 518.

G. simulatrix Marquand, sp. nov. ; peraffinis *G. tatsienensi* Franch., a qua habitu, caulibus ramosis, floribus fere duplo minoribus differt.

Annual, with a single rather short root. *Stems* numerous, branched, glabrous, up to 3.5 cm. long, arising direct from a rosette of leaves. *Rosette leaves* ovate, 6 mm. long, 4 mm. wide, with thickened margin, apex cuspidate. *Cauline leaves* resembling the rosette leaves but smaller and narrower, 4-5 mm. long, 1.5-2 mm. wide, acute. *Flowers* sessile or subsessile. *Calyx* campanulate ; tube 3 mm. long, 3 mm. in diameter ; lobes lanceolate, apiculate, with thickened margins, 2 mm. long, 1.25 mm. wide, sinus truncate. *Corolla* cylindrical, pale blue ; tube 4-5 mm. long, 2.5 mm. in diameter ; lobes ovate, acute, 2.5-3 mm. long, 1.5 mm. wide, blue suffused with green on the interior ; plicae variable in shape within the same corolla, deltoid-subovate, acute or unequally bifid, much shorter than the lobes. *Ovary* subsessile. *Capsule* elliptic-oblong, strongly compressed and winged at apex, ultimately exserted on a stipe up to 7 mm. long. *Seeds* subangular, \pm rhomboidal, minutely rugulose, 0.5-0.6 mm. long, 0.3 mm. in diameter.

S. TIBET. Abundant on grassy hill slopes, 3000 m., May 18 (? 1933), *Ludlow & Sherriff* 12 (type in Brit. Mus.).

Very closely allied to *G. tatsienensis* Franch., a species with flowers nearly twice the size of the present one and with unbranched stems. In both species, as indeed with several in this Section, there is a striking range of variation in the form of the plicae, in some cases even within the same corolla.

G. sororcula Burkill in Journ. As. Soc. Beng. n.s. 2, 315 (1906).

TIBET. Flowers bright blue ; on open pine clad slopes, abundant,

Modung, Rong Tö valley, Zayul, 2100-2700 m., May 27, 1933, *Kingdon Ward* (with no. 10433).

G. Yokusai *Burkill* in Journ. As. Soc. Beng. n.s. **2**, 316 (1906), forma.

TIBET. Flowers deep blue; on alpine turf slopes, Shiuden Gomba, Nagong, 3900-4200 m., Sept. 1, 1933, *Kingdon Ward* 10802.

XXII—MISCELLANEOUS NOTES.

Notes on *Lilium ochraceum* Franchet and *L. nepalense* Don.—(1) TYPE SPECIMEN OF *LILIAM OCHRACEUM*. In connection with the preparation of the description of *L. ochraceum* Franchet for part 5 of the Supplement to Elwes's "Monograph of the Genus *Lilium*," it has been necessary to consult Franchet's original material. Through the kindness of Monsieur le Prof. Dr. H. Humbert, Directeur, Muséum national d'histoire naturelle, Paris, all the specimens in question have been sent to Kew on loan. As the precise nature of these specimens has never been recorded it appears to be worth while to publish the details.

Franchet's description is based on three gatherings, as mentioned in his well-known paper "Les Lis de la Chine et du Thibet" (Journ. de Bot. 6, 1892). The gatherings are cited in the following sequence, but the data transcribed below are taken from the labels on the herbarium sheets, since they are somewhat fuller than those published.

Lilium ochraceum. [Small label added]

"*Lilium* (Martagon). Fl. jaunâtres. Lieux frais au pied du Tsong chou à 3000 m. d'alt. le 20 Août 1887. legi ipse J. M. Delavay" [Field label]

Lilium ochraceum Franch

"No. 369 Vois des montagnes au-dessus de Tapintze, 1 Sept. 1882" Plantes de Chine (Yun-nan) M. l'Abbé Delavay 1883-1885. [Printed label]

"No. 3274 Fl. jaunâtres; a la fin turbinée. Les broussailles, sur le Hee chan men à 2800 m. d'alt. legi ipse. le 29 Juillet 1888, J.M.D." [Field label]

There is no doubt that all three gatherings represent *L. ochraceum*. The original description is brief but correct. The leaves are small, up to 5 cm. long and 8 mm. wide. As they are, however, from three different localities, and were collected in three different years, and apparently represent slightly different colour forms, it is advisable to select one as the nomenclatural type (lectotype).

The first gathering cited by Franchet consists of a good specimen with two flowers (one a freshly-opened bud) and dark in colour. It is probably the form very finely speckled with cerise which has since been collected by Forrest and others. The second gathering cited is also a good specimen and has now but a single flower. The flower is pale yellow with the purple coloration in the throat which is characteristic of the usual form of the species. The third

gathering consists of a poor specimen possessing a single flower, now dissected, which was apparently rather dark and very small. This gathering may be disregarded.

Although the specimens were cited by Franchet, none of the sheets was labelled by him. Dr. Humbert informs me that the small label added to the first specimen is in the hand-writing of M. Paul Danguy. The second specimen has a herbarium label with the words of the last line printed; the name, locality and date are added in ink in an unknown hand.

L. ochraceum is a very common species in Western Yunnan and Upper Burma. It occurs in varying shades of yellow and normally has a variable amount of purple colouring in the throat. Forms occur which are finely speckled with maroon or with purple, but these are relatively scarce. The original description states that the flowers are "lutei immaculati."

As the first gathering would appear to be a dark form and as the second specimen, No. 369, shows the yellow flowers with purple throat which exactly resemble the small forms of *L. ochraceum* as understood to-day, it should clearly be chosen as the lectotype of the species.

The localities in question are well known collecting grounds of Delavay. Mr. T. Tang of the Fan Memorial Institute informs me that Tsong-chou is a district near Tsang-shan, a famous summit on the Tali range, which lies to the west of Tali lake (Er Hai); and that Tapintze is another locality on that range and further to the north. The two most important gatherings of the original material were therefore collected on the Tali range.

(2) *L. OCHRACEUM* VAR. *BURMANICUM* (W. W. SM.) COMB. NOV. In the same number of the Supplement the status of *L. nepalense* var. *burmanicum* W. W. Sm. is discussed. E. H. Wilson reduced this plant to a synonym of *L. ochraceum*. With the advent of living plants of *L. nepalense* it has been possible to define the Nepal plant more accurately, and it can now be stated that var. *burmanicum* is not a variety of this species but is, as Wilson believed, connected with *L. ochraceum*. It is however so different from the original form of that plant as collected by Delavay in Yunnan that it is best maintained as a separate variety. The name ***L. ochraceum*** var. ***burmanicum*** comb. nov., is therefore proposed.

(3) *L. NEPALENSE* VAR. *CONCOLOR*, VAR. NOV. It has long been known that *L. ochraceum*, which has normally more or less purple coloration in the throat, possessed a pure yellow form which was originally described by Baker as *L. primulinum*. This was referred to *L. ochraceum* by E. H. Wilson and named var. *primulinum*. An examination of Baker's type specimen shows that Wilson was correct. Some writers, however, have regarded Baker's plant as a colour form of *L. nepalense* and consequently considerable confusion exists as to its true position. The difficulty has been solved by the discovery that the true *L. nepalense* also possesses a self coloured

yellow form. Intermediates between the normal and the self coloured form are to be found, but as both species and both varieties are in cultivation, in the interests of uniformity, a varietal name for the newly recognized plant is advisable. The full account of the two lilies and their colour forms will appear in part 5 of the Supplement but for various reasons early publication is desirable and the diagnosis of the new variety is therefore appended.

L. nepalense var. **concolor**. A forma typica floribus non purpureo-coloratis differt. Type in herbarium Royal Botanic Garden, Edinburgh; specimen cultivated in Rock House, 1930, from bulb forwarded from Bhutan by Col. F. M. Bailey. A. D. COTTON.

A New Hybrid Eucryphia.—The hybrid between *Eucryphia glutinosa* (Poepp. et Endl.) Baill. and *Eucryphia lucida* (Labill.) Baill. was raised at Rostrevor, Co. Down, Ireland, in the gardens of the late Sir John Ross of Bladensburg, and was mentioned for the first time in *The Gardeners' Chronicle* **100**, 187 (5th September 1936), as *Eucryphia* "Rostrevor" Hort. Since the short note was in English and appeared after the publication (in January 1935) of Art. 38 of the International Rules as emended at the Fifth International Botanical Congress at Cambridge in 1930, it seems desirable to give a full Latin description of this hybrid, and to provide a scientific name which is in accordance with the rules and which at the same time indicates more or less the character of the hybrid.

The Latin description has not been taken from the original hybrid plant, but from one of its descendants (a cutting), cultivated in the Royal Botanic Gardens, Kew.

× **Eucryphia intermedia** Bausch (*E. glutinosa* (Poepp. et Endl.) Baill. × *lucida* (Labill.) Baill.) hybr. nov. [Eucryphiaceae]; inter parentes optime intermedia, ad *E. glutinosam* ob folia nonnulla praesertim vetustiora pinnata 2-5-foliolata plerumque 3-foliolata foliolis saepe praesertim dimidio superiore dentatis, ad *E. lucidam* ob folia subtus glaucescentia, nonnulla praesertim juniora parva simplicia plerumque integra oblonga brevipetiolata approximans.—*E.* "Rostrevor" Hort., Gard. Chron. **100**, 187 (1936), descr. angl.

Arbor parva semisempervirens, altitudine adhuc incerta; ramuli statu vivo subteretes, subcompressi, sub pressione costato-angulati, brunnei hic illic pruinosi, inferne glabri, superne pilis subadpressis pubescentes. *Stipulae* ovatae, acutae, glabrae, brunneae, 5-7 mm. longae, 3.5-4.5 mm. latae. *Folia* omnia subtus glaucescentia, marginibus debiliter pilosis, ceterum glabra vel juventute supra pubescentia, venatione ut in *E. glutinosa* obvia; saepe summa et juniora per paria ut in *E. lucida* parva, simplicia, oblonga, apice rotundata saepius brevissime emarginata et bidentulata rarius integra obtusa vel acuta, basi cuneata et in petiolum pubescentem 3-5 mm. longum attenuata, nonnunquam rotundata, 1.4-5.85 cm. longa, 0.5-2.4 cm. lata, saepius integra, rarius dimidio superiore vel

apicem versus dentata; nonnunquam in eodem pari cum altero folio pinnato alterum simplex ceteris simplicibus simile vel rarius basi cordatum invenitur; folia pinnata petiolo 0.4–1.1 cm. longo pubescente; foliola lateralia subsessilia, elliptico-oblonga, apice plerumque obtusa rarius acuta semper breviter apiculata, basi rotundata vel subtruncata aliquantum obliqua, 1.2–3.8 cm. longa, 0.5–1.7 cm. lata, minora integra, majora subintegra vel dimidio superiore argute serrata; foliolum terminale petiolulo 2–5 mm. longo pubescente, vel in foliis 2- vel 4-foliolatis subsessile basi valde obliquum, ellipticum, elliptico-oblongum, oblongum vel oblongo-lanceolatum, apice plerumque obtusum breviter apiculatum vel emarginatulum, basi acutum cuneatum usque rotundatum, 2.2–6.3 cm. longum, lateralibus semper 1.5–2-plo longius, 0.6–3 cm. latum, integrum vel dimidio superiore vel saepe tantum apicem versus ut in *E. glutinosa* serratum. *Inflorescentia* a me nondum visa; flores teste hortulano quodam albi, eis *E. lucidae* paulo majores.

Cult. in Hort. Bot. Reg. Kew., Jan. 1937, *J. Bausch* (typus exempli sicci in Herb. Kew.); descr. et ex arbore viva et ex exemplo sicco confecta.
J. BAUSCH (HOLLAND).

The Birds of Tropical West Africa, Vol. IV.*—The present volume contains the account of the first eight families included in the vast order *Passeriformes*, the so-called “Perching Birds”; these are the *Eurylaemidae* (broadbills), *Pittidae* (pittas), *Alaudidae* (larks), *Motacillidae* (wagtails and pipits), *Timaliidae* (babblers), *Pycnonotidae* (bulbuls), *Muscicapidae* (flycatchers), and *Turdidae* (thrushes). Characters by which certain families are differentiated from one another are found to overlap in a most disconcerting way. It is therefore not surprising that although ornithologists have long been familiar with the birds of the genus *Smithornis*, it was not until 1914 that it was first suspected (by Mr. G. L. Bates, a set of whose Cameroons plants is preserved in the Kew Herbarium), that this African genus belonged to the *Eurylaemidae*. This suspicion was confirmed in 1924 by the anatomical investigations of Dr. P. R. Lowe.

The volume begins with a table of classification of the *Passeriformes*, and an illustrated key to the West African families and genera. It is accompanied by a detailed map of the Gambia, in which the boundaries and roads are revised up to 1931. The plan of the work is described in previous notices (*K.B.* 1930, 334; 1932, 416; 1933, 142).

To the general reader the accounts of the habits of the various species, subspecies and races will probably form the most interesting part of the book. These include observations made in other parts of Africa. “The myth that the nightingale never sings in tropical Africa during its winter sojourn in that country seems now to be

* By D. A. Bannerman. The Crown Agents for the Colonies, 4 Millbank, Westminster, 1936. Pp. xl. + 459, full page coloured plates 14, text figs. 117, one map. Price 22s. 6d.

successfully disproved. Mr. Holman probably sums the matter up correctly when he states that the full-throated song to be heard in England on summer nights is never heard in the same degree in Africa, but that it does employ many of its beautiful notes can no longer be denied."

The food of the Upper Guinea little green bulbul (*Andropadus virens griseus*) consists wholly of berries of many different kinds, the fruits of two exotic weeds, *Clidemia hirta* and *Lantana*, which both grow on the forest edge at Amani, being much sought after. Stomachs of the yellow-vented bulbul (*Pycnonotus tricolor tricolor*) examined in Tanganyika "contained many different berries, among them *Lantana*, of which this species must be reckoned an active disseminator." Sjöstedt's white-tailed greenbul was often found by Bates in the primeval forests of the Ja river, Cameroons, but still oftener in the second-growth forest consisting principally of Aseng trees (*Musanga Smithii*) on the fruit of which this greenbul feeds. The food of Dunn's lark (*Eremolauda dunnii*) in the neighbourhood of Timbuktu consisted of seeds, largely of *Panicum turgidum*. The Palestine short-toed lark (*Calandrella brachydactyla hermonensis*), newly arrived in the French Sudan from the north of the desert, "found the sandy ridges of Taberréshat a good place to stop. They spent the time under the tussocks of *Panicum turgidum* that grew along the sides of these ridges, getting not only shelter from the hot sun under these tussocks, but also food from the seeds they shed."

Among other plants mentioned are the "heskanit" grass [*Cenchrus biflorus* and *C. ciliaris*] and the feathery prairie-grass (*Aristida papposa*) with which the Kordofan or golden bush-lark (*Mirafra cordofanica*) is often associated. The fields of acha grass (*Digitaria exilis*), grown in the north-east corner of Benue Province and the south-west corner of the Plateau Province of Nigeria, attract quantities of tree pipits (*Anthus trivialis trivialis*). Buchanan's bush-skulker (*Argya fulva buechanani*) subsists entirely on insects, mostly beetles or grasshoppers, where these are procurable. When insects are scarce, however, it lives as well on the berries of *Salvadora*. At Tabarréshat Well in the western Sahara, several small parties were observed wherever *Acacia tortilis* grew in any number.

One of the most curious birds described and figured is Kemp's bush-creeper (*Macrosphenus kempfi*), which possesses a neck which it can stretch out at will, and when agitated puffs out the long silky feathers of its back and those of the flanks and breast. The most beautiful is undoubtedly the blue fairy flycatcher (plate 9, p. 287), which inhabits all the British West African colonies. Its plumage is light silvery blue (almost grey blue at certain seasons), becoming whitish on the belly. The male bird constantly spreads wide his fan-shaped tail, and when displaying to the female flaps his wings in an agitated manner.

Examples of discontinuous geographical distribution, for which botanical parallels exist, are those of the grey-chested akalat

(*Illadopsis poliothorax*) and the Ruwenzori hill babbler (*Pseudoalcippe atriceps*). The former has been found on Fernando Po at an altitude of 6000 ft., on the Cameroon Mountain, and far away on Ruwenzori, at 7000–8000 ft. Nowhere in the great stretch of intervening forest country has it been found to occur. "This curious distribution is not confined to the species under review; there are a number of other forms peculiar to both mountains." The latter species occurs in the Bansa and Genderu Mountains in British Mandate Cameroons, at altitudes of 4000–6000 ft., on Ruwenzori from 6500 to 9000 ft., and also in the Kivu and Ruanda districts of Uganda.

The volume under review maintains the high standard of its predecessors, and reflects credit on all concerned in its production. The author estimates that two further volumes will be required to complete the work.

Glamorgan Trees and Shrubs.*—The county of Glamorgan is a region which has received in the past but scant attention from chroniclers of the rare and exceptional plants growing in Great Britain. That this lack of interest in the county's treasures is far from justified is shown by the lengthy list of hardy trees and shrubs compiled by Mr. Hyde. The coastal plain of Glamorgan is a fertile region with a mild climate so well suited to the growth of trees and shrubs that only trees of a notable size and shrubs of special horticultural merit could be included in the list.

A short introduction draws attention to some of the outstanding plants, among them an Aleppo pine, *Pinus halepensis* Mill., the largest British example, 73 feet high; the unique orangery at Margam; the European silver fir, *Abies alba* Mill., 145 feet high, at Aberpergwm; and the pencil cedar, *Juniperus virginiana* L., 82 feet high, at Cefn Mably. Many others of equal interest are to be found in the list. In certain cases, information of special interest follows the enumeration of localities and size data. Thus we are told that *Ginkgo biloba* L. is planted as a street tree in Roath, Cardiff. The list is singularly free from errors and misprints, but on p. 228 the initial "Q" is omitted from *Quercus*, and *Q. rubra* L. is given when *Q. rubra* Du Roi evidently is intended, though *Q. borealis* Michx. should be used. The list is illustrated by excellent photographs of some of the individual trees and shrubs mentioned.

R. MELVILLE.

* "Trees and Shrubs" By H. A. Hyde, M.A., F.L.S. Glamorgan County History, vol. I—Natural History, William Lewis, Cardiff. 1936. Pp. 217–231.

Printed under the authority of HIS MAJESTY'S STATIONERY OFFICE
By the South Essex Recorders, Ltd., High Road, Ilford.

(525) Wt. 15/33 825 5/37 S.E.R. Ltd. Gp. 381